

SIXTH ANNUAL REPORT

FEDERAL
COMMUNICATIONS
COMMISSION

copy 4



FISCAL YEAR ENDED JUNE 30, 1940

(With Notation of Subsequent Important Developments)

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON , 1940

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COMMISSIONERS

MEMBERS OF THE FEDERAL COMMUNICATIONS COMMISSION

[For fiscal year ending June 30, 1940]

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*THAD H. BROWN

*Term expired June 30, 1940.

LETTER OF TRANSMITTAL

FEDERAL COMMUNICATIONS COMMISSION,
Washington, D. C., December 1, 1940.

To the Congress of the United States:

Herewith is submitted the Sixth Annual Report of the Federal Communications Commission, pursuant to section 4 (k) of the Communications Act of 1934, as amended.

Though this report covers in detail the activities of the Commission for the fiscal year ending June 30, 1940, subsequent important developments are incorporated in order to furnish the Congress with a more timely and broader view of the augmented duties of the Commission, particularly in connection with the co-ordinated national defense program.

Respectfully,

JAMES LAWRENCE FLY,
Chairman.

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CHAPTER I

National Defense and Communications

- 1. COMMISSION'S ROLE IN NATIONAL DEFENSE**
- 2. DEFENSE COMMUNICATIONS BOARD**

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CHAPTER I—NATIONAL DEFENSE AND COMMUNICATIONS

1. COMMISSION'S ROLE IN NATIONAL DEFENSE

Since making its last annual report, the Federal Communications Commission has been assigned a definite and exacting role in the coordinated national defense program. Its particular contribution to preparedness is to "police" radio communications.

A special appropriation of \$1,600,000 was authorized by the President for augmented work of this nature. The Commission received \$175,000 from Congress with which to relocate six of its seven main monitoring stations. These supplemental sums enabled the Commission to expand its field force and improve its "listening posts" for more effective surveillance of radio channels.

Recent events have demonstrated the importance of communications in time of national emergency. In addition to its normal regulation and supervision of all interstate and foreign communication by means of electrical energy, the Commission is now charged with seeing that such transmission does not run counter to our neutrality or national defense requirements. Radio, in particular, is a new and vital factor to be reckoned with in insuring the Nation's security.

In consequence, the Commission has added some one hundred new field stations to its previous score of such offices. These field posts are strategically located throughout the country and its possessions for investigation as well as routine assignments. Monitoring stations determine the bearings and characteristics of unauthorized or questionable transmission. To mobile units, which operate from field stations, falls the task of tracing the origin of such signals.

The Commission licenses citizens only for all classes of radio transmission. Heretofore it has depended upon the applicant's own statement as to that requirement. Today the Commission wants to be fully and accurately informed about the thousands of persons who operate electrical apparatus capable of farflung and almost instantaneous communication. So it is requiring all radio operators—commercial as well as amateur—to furnish documentary proof of citizenship, as well as fingerprints and photographs, for permanent identification record.

With the cooperation of radio, wire, and cable companies, which handle a considerable volume of official despatches and other Government messages, it is compiling similar data with respect to employees who engage in international communication.

In addition, the Commission last June issued an immediate ban on amateur communication with foreign countries, and further prohibited the use of portable long-distance transmitters by amateurs. At about the same time, the Commission warned all ship radio operators that it would enforce strictly the international agreement which prohibits transmission of "superfluous, unnecessary, or unidentified communications."

More specific information about these precautionary moves will be found in subsequent chapters relating to various types of communication services.

Section 1 of the Communications Act gives the Commission an express mandate to act in its regulation "for the purpose of the national defense." The act also grants the President special authority over communications during national emergency. For one thing, section 606 enables the Chief Executive, should he find it necessary, to suspend or amend existing rules and regulations governing radio communication, and permit Government use of particular facilities.

The Commission does not, of course, want to interfere with communications any more than is necessary for the national protection. It desires particularly to preserve the present linking up of radio facilities throughout the land for efficient and instantaneous communication. Maintenance of international communications is likewise important.

In its added responsibilities due to the national defense, the Commission is receiving the cooperation of all industries concerned. This collaborative spirit is reflected in all fields and groups. It not only permeates the broadcasters but extends throughout the common carrier systems and into the domain of the amateurs.

The latter constitute a valuable reservoir of operators and other experts for the military and other services in time of war. Besides working in close harmony with the Commission in normal times, the amateur has been of particular aid in the national-defense set-up by policing his own frequencies. By voluntary action, most amateurs stopped communicating with warring countries before the Commission imposed its prohibition on such foreign contacts.

It is well to stress that action of the Commission in prescribing certain general curbs is precautionary rather than disciplinary. The Commission is proud of the patriotic and cooperative response of operator and industry both.

2. DEFENSE COMMUNICATIONS BOARD

On September 24, 1940. President Roosevelt issued an Executive order establishing a Defense Communications Board to determine, coordinate, and prepare plans with respect to the relationship of radio, wire, and cable communications to the national defense.

As explained by the President on that occasion:

"The purpose of the Defense Communications Board, created today by Executive order, is to coordinate the relationship of all branches of communication to the national defense.

"The Defense Communications Board was initiated jointly by the various Government departments and agencies having a vital interest in this phase of the preparedness program. The board is basically a planning agency, without operating or procurement functions. As such it is charged with the important duty of charting the utilization and control of our communication systems in the best interests of the national security.

"The board will have no power to censor radio or other communications, or to take over any facilities.

"This task of planning is not confined to radio broadcasting, but also embraces common carriers, such as commercial radiotelephone and

radiotelegraph as well as other telephone, telegraph, and cable facilities.

"The board does not propose to interfere with the normal operation of broadcasting or other forms of communication any more than is necessary for the national protection. Through correlated planning, it will seek to gear the great and strategically valuable American communications system, in both the domestic and international fields, to meet any situation the national interest may require.

"The various branches of the communications industry will cooperate in an advisory capacity with the board, which will be composed of the Chairman of the Federal Communications Commission, the Chief Signal Officer of the Army, the Director of Naval Communications, an Assistant Secretary of State, and an Assistant Secretary of the Treasury. Where the activities of the board impinge upon any functions of Government departments, representatives of such departments will be placed upon appropriate committees.

"The board has had the cooperation of the radio industry in the preparation of this order. With industry cooperation, the board will appoint committees from every branch of communications—broadcast and other radio services, cable, telegraph, and telephone—as well as from labor groups. All plans involving the utilization of private facilities, or requiring industry cooperation, will be adopted only after consultation with such industry representatives, and the particular private companies whose properties may be involved."

The text of the Executive order creating the board and defining its functions and duties follows:

Whereas coordinated planning for the most efficient control and use of radio, wire, and cable communication facilities under jurisdiction of the United States in time of national emergency involves the consideration of the needs for communication of the armed forces of the United States, of other Government agencies, of industry, and of other civilian activities; and

Whereas such planning must be accomplished as a matter of preparation for national defense; and

Whereas the interest of national defense in the matter of control and use of communication facilities during any war in which the United States may become a belligerent is deemed paramount:

Now, therefore, by virtue of the authority vested in me as President of the United States, and by the Communications Act of 1934 (48 Stat. 1064), as amended, it is ordered as follows:

1. There is hereby created the Defense Communications Board, hereinafter called the Board, consisting of the Chairman, Federal Communications Commission, the Chief Signal Officer of the Army, the Director of Naval Communications, the Assistant Secretary of State in charge of the Division of International Communications, and the Assistant Secretary of the Treasury in charge of the Coast Guard.

2. The functions of the Board shall be, with the requirements of national defense as a primary consideration, to determine, coordinate, and prepare plans for the national defense, which plans will enunciate for and during any national emergency—

(a) The needs of the armed forces of the United States, of other governmental agencies, of industry, and of other civilian activities for radio, wire, and cable communication facilities of all kinds.

(b) The allocation of such portions of governmental and nongovernmental radio, wire, and cable facilities as may be required to meet the needs of the armed forces, due consideration being given to the needs of other governmental agencies, of industry, and of other civilian activities.

(c) The measures of control, the agencies to exercise this control, and the principles under which such control will be exercised over nonmilitary communications to meet defense requirements.

3. The chairman of the Federal Communications Commission shall be the chairman of the Board. In the absence of the designated chairman the temporary chairmanship shall devolve upon the remaining members of the Board in the following order:

1. The Chief Signal Officer of the Army or the Director of Naval Communications, whichever may be senior in rank.
2. The Chief Signal Officer of the Army or the Director of Naval Communications, whichever may be junior in rank.
3. The Assistant Secretary of State in charge of the Division of International Communications.
4. The Assistant Secretary of the Treasury in charge of the Coast Guard.

In the absence of any regularly designated member the agency which he represents may be represented by an alternate from that agency, designated by the head thereof, but such alternate shall not serve as chairman. The Assistant Secretary of the Treasury in charge of the Coast Guard is designated as the secretary of the Board.

4. The Board shall take no cognizance of matters pertaining to censorship. The Board shall study the physical aspects of domestic standard broadcasting and shall recommend such precautions, supplementary facilities, and reallocations as it shall deem desirable under foreseeable military conditions. It shall also make plans for the speedy and efficacious use of all necessary facilities in time of military emergency.

5. The Board shall appoint such committees as may be necessary to carry out its functions and to provide for continuing studies and for contact with other Government agencies and with the civil communication industry.

6. Except as otherwise instructed by the Board, committees appointed thereby shall have no power to make final disposition of any matter presented to them by the Board for study, but they shall express by written report their findings and recommendations. Minority reports may be submitted, if deemed of sufficient importance to warrant further consideration by the Board.

7. The Board and the committees shall call for consultation such representatives of other Government agencies and of the civilian communication industry as may be deemed advisable in obtaining full knowledge of the situation being studied, to the end that the needs of all may be considered and provided for in so far as the situation permits. Other governmental agencies are directed to cooperate in providing assistance required by the Board in its studies.

8. During any war in which the United States is a belligerent or any national emergency the existing Interdepartment Radio Advisory Committee shall act as a Committee of the Board, but only in an advisory capacity. While the Interdepartment Radio Advisory Committee is so acting as an advisory committee all of its reports, recommendations, or communications normally prepared for submission to the President shall instead be submitted to the Board for consideration from the standpoint of national defense and for disposition.

9. Reports containing the findings and recommendations of the Board shall be submitted to the President for final action through one of his administrative assistants.

CHAPTER II

General

1. ADMINISTRATION
2. PROCEDURE
3. FIELD ACTIVITIES
4. INTERNATIONAL
5. INTERDEPARTMENT RADIO ADVISORY COMMITTEE
6. TECHNICAL INVESTIGATION
7. PUBLICATIONS

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CHAPTER II—GENERAL

1. ADMINISTRATION

The Federal Communications Commission functions as a unit, directly supervising all of its activities. Under this over-all direction there have been delegations of responsibility pursuant to policy determinations by the Commission for the execution of particular assignments. Committees of commissioners, usually consisting of three members, have been assigned to make special studies, conduct important hearings, and direct particular undertakings.

The Commission has provided under Administrative Order No. 2 for the disposition by individual commissioners, designated each month to serve in rotation, of interlocutory motions and of temporary broadcast authorizations. Also, the order delegates to the *Administrative Board*, consisting of the heads of the departments of the Commission, responsibility for the disposition of specified classes of applications, requests, and administrative matters in accordance with established policies.

ORGANIZATION

Four units comprise the staff organization of the Commission. By name and duties they are:

Accounting, Statistical, and Tariff Department, whose functions include matters of accounting regulation, compilation and analysis of statistics, and tariff analysis and regulations.

Engineering Department, whose functions include the engineering phases of broadcast, common carrier, and private and ship service regulation and enforcement; international and interdepartmental matters; supervision of the field staff; and technical engineering information and research.

Law Department, whose functions include the legal phases of radio licensing and of common carrier regulation; administration (including legislation, rule-making, and international matters); investigation; and litigation before the courts.

Secretary's Office, which has charge of all matters of internal administration, handles the issuance of licenses, maintains records, and supplies official copies of Commission orders and decisions.

The heads of the Commission's departments continued to meet regularly during the year as a *Committee on Rules* for the consideration, looking to recommendations to the Commission, of proposals for new or revised rules and regulations. These suggestions were referred to it by the Commission or its staff, or submitted by the public or industry. The *Committee on Rules* also makes recommendations upon matters of administration which contribute to the coordination of the staff activities of the Commission.

2. PROCEDURE

The Communications Act of 1934 provides, among other things, that the Commission may grant licenses only upon written applications, with certain exceptions for renewal of licenses and modifications of licenses in emergency conditions for vessels or aircraft of the United States without receipt of formal applications.

APPLICATIONS

The act provides further that applications shall set forth such facts as the Commission may prescribe as to the citizenship, character, and financial, technical, and other qualifications of the applicant; the ownership and location of the proposed station, and of the stations, if any, with which it proposes to communicate; the frequencies and the power desired; the hours of the day or other periods of time during which it is intended to operate; the purposes for which the station is to be used; and such other information as the Commission may require. In this connection the Commission is authorized to obtain from an applicant or licensee further written statements of fact to enable it to determine whether an original application should be granted, or whether an existing license should be revoked.

NEW APPLICATION FORMS

Application forms adopted pursuant to provisions of the act were revised during the year to require submission of more comprehensive information regarding applicants and their intentions. As the result of an exchange of ideas with broadcast groups, certain requirements in these forms were subsequently modified in the interests of simplification and expedition, without sacrificing essential information.

Applicants are required to show that they are qualified as to citizenship and otherwise legally entitled to hold licenses or permits. In addition, the Commission requires submission of information as to the technical, financial, and other qualifications of the applicant, including facts as to occupation and profession, also other interests of any substantial amount (25 percent or greater in other business or enterprise). In the case of applicants other than individuals, similar information is required with respect to the persons who may be interested in or have responsibility in the project as corporate officers, principal stockholders, members of a governing board, partnership or other association. Information as to financial ability and plans for financing stations is required in sufficient detail to disclose how the proposed station is to be operated and, particularly, the sources of funds to be used.

In addition, the Commission requires submission of complete technical data about the equipment to be used, and a full statement as to the service to be rendered, including information as to the staff to be engaged.

EXAMINATION OF APPLICATIONS

The examination which the Commission makes of each application includes reports and recommendations by its engineering, accounting, and law departments. It is frequent practice, in the course of consideration of an application, to request additional information from

the applicant. Since the close of the fiscal year covered by this report there has been set up in the law department an inquiry section to conduct investigations where the application and other information are insufficient for proper determination.

It is essential to determine whether an applicant's proposal is consistent with provisions of the Communications Act, rules of the Commission, international agreements relating to allocation of radio facilities, and other requirements. Specifications as to equipment must conform to standards required by the Commission. Also, it must be determined whether particular operating assignments applied for are available. In most instances the examination of an application requires extensive study to determine the effect of the proposed operation upon other services as well as with respect to individual results which the particular applicant might be expected to obtain. It is often necessary to make simultaneous examination of applications, either because of conflicts between applicants or because of cooperative efforts by applicants involving the use of directional antennae to afford mutual protection.

Examination of applicants as to their qualifications is made sufficiently broad to cover not only the qualifications specifically required by provisions of the act, such as those relating to citizenship, but also to include information as to an applicant's responsibility to render a public service.

In addition to considering each application on its individual merits, it must also be examined in relation to its effect upon broadcasting services generally. Due to the fact that broadcasting facilities are extremely limited, the question of determining what action upon a given application would be in the public interest frequently resolves itself into choosing between several applications, or of determining whether existing facilities should be disturbed to provide for a proposed new service.

The use of the new and more comprehensive application forms coupled with the practice of requesting additional information from applicants when necessary, plus the facility for undertaking investigations in particular cases, has enabled the Commission to make more active contribution to improvements in broadcast service than at any previous time in its history, thus further safeguarding the public broadcast and communication channels.

3. FIELD ACTIVITIES

In administering and enforcing laws, regulations, and international treaties pertaining to radio, the Commission depends in large measure on its field staff. The ether waves are, in effect, patrolled by field offices strategically located throughout the United States and its possessions, augmented by seven main monitoring stations. The latter are at Atlanta, Baltimore, Boston, Grand Island (Nebr.), Allegan (Mich.), San Pedro (Calif.), and Portland (Oreg.).

Monitoring stations are the Commission's "listening posts." In general, they do not participate in the investigation of unauthorized transmission other than to report and record such signals as proof of operation. The task of tracing unlicensed stations is performed mainly by inspectors. The latter are radio engineers and, in addition,

are capable radio operators. Many have had previous experience in military, maritime, aviation, and other communications services. They are familiar with technical procedure, which is of material aid in uncovering illicit use of radio.

At each radio district headquarters, specially equipped automobiles are provided for investigation work. Some of these cars are equipped with all-wave receivers which, when necessary, may be removed from the car for operation. The mobile equipment is also used to transport examination and technical equipment.

Besides seeking out unlicensed operators, the Commission's field staff inspects all classes of radio stations—broadcast, police, ship, amateur, aviation, etc.; examines radio operators for various classes of licenses; monitors radio transmission for adherence to frequency, quality of emission, and compliance with prescribed procedure; conducts field strength surveys and analyzes signal characteristics; and investigates complaints of interference to radio reception. During the last fiscal year the Commission investigated more than 1,000 complaints of unlicensed operation, and the number of these and other cases pressing for investigation is growing under the present situation.

AUGMENTED DUTIES

Effective policing of communications under the coordinated national defense program necessitates the Commission augmenting its field force with additional fixed monitoring facilities, long-range direction-finder stations, as well as new bases of operation for mobile units, and adding several hundred inspectors and other experts to its field staff.

This supplemental force is needed to maintain a comprehensive surveillance of all communication channels. Besides increased monitoring duties, the field division is required to watch radiotelegraph and radiotelephone circuits for superfluous signals, record same, and translate foreign-language broadcast material when necessary. It must also make certain of the citizenship of all persons engaged in the types of communications which come under Commission jurisdiction. This figure covers about 100,000 licensed radio operators—commercial and amateur—and thousands of wire and cable operators. (Details of such supervision are treated more fully elsewhere in this report.)

FIELD OFFICE LOCATIONS

At the close of the fiscal year the location of Commission monitoring stations and field offices was as follows:

- *Atlanta (Federal Annex).
- *Baltimore (Fort McHenry).
- *Boston (customhouse).
- Buffalo (Federal Building).
- Chicago (courthouse).
- Cleveland (old post office).
- Dallas (United States Terminal Annex).
- Denver (customhouse).
- Detroit (new Federal Building).
- Galveston (Federal Building).
- *Grand Island, Nebr. (Central Frequency Monitoring Station).
- *Allegan, Mich.
- Kansas City, Mo. (courthouse).

*Monitoring stations.

- Los Angeles (post office—Courthouse Building).
 Miami (Federal Building).
 New Orleans (customhouse).
 Newport News (post office—ships only).
 New York (641 Washington Street).
 Norfolk (new post office).
 Philadelphia (customhouse).
 *Portland, Oreg. (new courthouse).
 Port Arthur, Tex. (post office—ships only).
 St. Paul (post office—Federal Courts Building).
 San Diego (customhouse—Court House Building).
 San Francisco (customhouse).
 *San Pedro (post office—Courthouse Building—ships only).
 Savannah (post office).
 Seattle (Federal Office Building).
 Tampa (post office).
 Honolulu, Hawaii (Aloha Tower).
 Juneau, Alaska (Shattuck Building).
 San Juan, Puerto Rico (Ochoa Building).

4. INTERNATIONAL

In view of the world situation, the Commission's International Division has collaborated actively with the Department of State in matters involving international use of radio, wire, and cable services.

The Commission has made a comprehensive survey of all existing international communication facilities operated between the United States and foreign countries. It has also completed a study of existing plant facilities, both cable and radio, and their capacities for handling traffic between this country and foreign points.

This was in addition to the work of handling routine records and correspondence relating to international communications, compiling lists of international broadcast stations, with individual listings of broadcast stations in the North American countries, issuing semi-monthly radio service bulletins, and notifying the International Telecommunications Union at Berne, Switzerland, of new broadcast stations authorized and frequencies assigned.

E. K. Jett, chief engineer, and Gerald C. Gross, chief of the International Division, represented the Commission at the principal international communications conference held during the fiscal year, namely, the Second Inter-American Radio Conference, which convened at Santiago, Chile, January 17, 1940. They were members of the United States delegation. The Commission also participated in preparatory work for future international conferences, notably the meeting of the International Consulting Committee on Radio (C. C. R. I.), scheduled for Stockholm, Sweden, in June 1940, and the International Telecommunications Conference, slated to meet at Rome, Italy, in 1942, both now postponed because of the war.

SECOND INTER-AMERICAN RADIO CONFERENCE

The Second Inter-American Radio Conference was held in Santiago, Chile, January 17 to 23, 1940. This conference resulted in revising certain provisions of the existing Inter-American Arrangement Concerning Radiocommunications, particularly in regard to allocation of frequencies to services in accordance with the latest

*Monitoring stations.

developments of the art. Resolutions were introduced providing for studies to be made with respect to securing additional frequencies for aviation, and for providing inter-American route frequencies on the basis of sectors of communication control. Also resolutions were introduced concerning the requirements of aeronautical point-to-point frequencies for the inter-American route; for division of time in the use of route frequencies; for study of aircraft radio equipment requirements in general, and for control stations; for exchange of information regarding air navigation aids; and for an interchange of meteorological information. Resolutions to further foster friendly relations between the peoples of the American Nations were introduced relative to increasing the short-wave broadcasting services and providing for the exchange of program schedules of such broadcasts, and calling upon the American nations to reaffirm reciprocally the principle of freedom in radio communications as a public service.

EIGHTH AMERICAN SCIENTIFIC CONGRESS

The Commission was represented officially at the Eighth American Scientific Congress held in Washington from May 10 to May 18, 1940.

NORTH AMERICAN REGIONAL BROADCASTING AGREEMENT

On March 29, 1940, Mexico deposited its ratification of the North American Regional Broadcasting Agreement which had previously been ratified by Canada, Cuba, Haiti, and the United States. The agreement specifies that its effective date will be 1 year from the date of the ratification by the last of the four countries to do so. Hence it will become operative March 29, 1941. It will result in eliminating many international interference problems among broadcasting stations in the North American region. [This agreement is discussed more fully in another section of the report.]

INTERNATIONAL BROADCASTING

The Commission has studied at great length the problem of increasing the value of the United States international broadcasting stations so that they compare favorably with similar stations of the other great nations of the world. With this end in view, on May 23, 1939, it issued rules requiring that by July 1, 1940 [subsequently extended to January 1, 1941], all such stations have a minimum of 50 kilowatts in power, and that directional antenna systems be installed with a power gain of at least 10 in the desired direction, which would insure the maximum signal strength to be delivered to the country or countries to which the transmissions are directed. Even now, reports from foreign countries, South America in particular, indicate a vast improvement in the reception of United States broadcast stations.

INTERCONTINENTAL AVIATION

Except for Government stations, all aeronautical radio in the United States is subject to the licensing authority of the Commission. Any arrangements made in regard to allocation of frequencies and other use of radio by aircraft flights to and from the United States must be coordinated with the Communications Act and the policies of the

Commission. The Commission has studied this problem thoroughly and in cooperation with the Civil Aeronautics Administration.

COMMITTEE ON COOPERATION WITH AMERICAN REPUBLICS

The chief of the International Division has participated regularly in the work of the Committee on Cooperation with the American Republics which has met periodically under the chairmanship of the Under Secretary of State, Mr. Sumner Welles.

5. INTERDEPARTMENT RADIO ADVISORY COMMITTEE

Representatives of the Commission have devoted a great deal of time and effort during the fiscal year to the work of the Interdepartment Radio Advisory Committee. This committee is the Government unit established for the purpose of advising the President with reference to the assignment of frequencies to Government radio stations or classes of Federal stations under the Communications Act. The committee has met once a month or oftener and has approved the assignment of 5,295 frequencies for Government radio stations during the past year. At the present time, there are 14,446 active assignments to Government radio stations, all of which have been recommended by the committee since its establishment.

Of particular note during the year was an equitable exchange of frequencies between the Commission and the Government departments which was accomplished through the medium of the Interdepartment Radio Advisory Committee (see chapter on Nonstandard Broadcast).

6. TECHNICAL INVESTIGATION

The Communications Act requires the Commission to "study new uses for radio, provide for experimental use of frequencies, and generally encourage the larger and more effective use of radio in the public interest." In following out this mandate, the Commission's engineering staff is investigating many techniques and refinements in all branches of communication. Some of these activities are mentioned under the respective chapter subjects in this report. Following is a brief survey of some pertinent engineering studies conducted during the year.

GREAT LAKES STUDY

Progress was made throughout the year on the problem of determining the best practicable frequency for the distress signal to be used on the Great Lakes and inland waterways. Studies were completed to determine the electrical constants of the lakes and the required communication ranges. Measurements were made of minimum required signal-to-noise ratio, of relative sky wave field intensities, and of atmospheric noise. Theoretical curves of ground wave field intensities at various distances were computed for the entire frequency range available. Work continues on measurements of transmission on the ultra-high frequencies over the lakes and on the radiation efficiency of typical ship antennas. Final evaluation of these factors will furnish the information needed for the technical phase of this problem.

STUDY OF ULTRA-HIGH-FREQUENCY GROUND-WAVE PROPAGATION

Results of a technical study of ultra-high-frequency-wave propagation were summarized in a report at the television hearing of January 15, 1940. The general characteristics of transmission on these frequencies were shown in a set of curves depicting (1) the effects of changes in operating frequency; (2) the influence of polarization; (3) the effect of transmitting antenna height at distances within and beyond the line of sight; (4) the effect of air refraction; (5) the effect of diffraction caused by the curvature of the earth; and (6) the comparative effect of antenna height and power on the service range.

TELEVISION SYSTEMS STUDY

Reports for the use of the Commission in connection with the television hearing were prepared on the practicability of various proposed systems of television. A joint report with the law department was also made on the patent situation in the television field, covering the ownership of important patents and patent licensing agreements. The department also participated in the formulation of rules and regulations governing the operation of television stations. (See more detailed television reference elsewhere in this report.)

STUDY OF TROPOSPHERIC WAVES

A special study was made for the purpose of developing an approximate theory explaining the nature of tropospheric waves, those waves which at the ultra-high frequencies are reflected back to the earth from the troposphere. The troposphere is a region above the earth's surface extending to a height of approximately 6 miles. From this theoretical study it was concluded that tropospheric waves will vary widely in intensity throughout days and seasons because of their dependence on atmospheric conditions (weather); that fading-free service areas will increase in proportion to transmitting antenna heights; that fading will be more severe as the operating frequency is increased and will occur at the shorter distances for the higher frequencies.

FIELD INTENSITY SURVEY OF ULTRA-HIGH-FREQUENCY STATIONS

A field intensity survey of several broadcast stations operating on the ultra-high frequencies was made in January and February of 1940. The observations on the frequency-modulated signals were made in a moving test car. Because of the greater variability of field intensities with distance characteristic of ultra-high frequencies propagation as compared with that at lower frequencies, a new method of analysis of the data was employed in which the field intensities exceeded for various percentages of the distance were indicated rather than those exceeded for various percentages of the time. New methods of determining antenna radiation characteristics were also necessary at these frequencies.

FREQUENCY MODULATION STUDY

In preparation for the hearing on aural broadcasting on frequencies above 25,000 kilocycles, a report was prepared in cooperation with the law department on the history and characteristics of ultra-high-frequency radio transmission, a comparison of the relative merits of

amplitude modulation (the method used in standard broadcast band) and frequency modulation (a new noise-reducing method) for aural broadcasting, the allocation problems involved, the probable economic effects of the new system on the standard broadcast system, and the patent situation on frequency modulation. (Frequency modulation is more fully discussed on subsequent pages.)

HIGH-FREQUENCY BROADCAST ENGINEERING STANDARDS

Fundamental differences in the propagation of ultra-high and standard broadcasting frequency bands necessitated a special study in connection with licensing requirements for ultra-high-frequency stations.

In the standard broadcast band, service areas are dependent on frequency and ground constants, while at the ultrahigh frequencies it is the transmitting and receiving antenna heights and the topography of the terrain which determine the service area. For this reason, it becomes feasible to adopt "the area to be served" rather than "the power and antenna height" as a basis for authorizations.

A chart was prepared for the convenience of prospective licensees in submitting their applications, to aid in determining the antenna height and the power necessary to obtain specific service ranges.

WAVE PROPAGATION STUDY

During the year an important study, namely, the formulation of graphical methods of computing ground-wave field intensity, was completed. The rigorous solution for the computation of ground waves has been known for a number of years. The difficulty has been that the solutions for the various cases, i. e., short distances, long distances, antennas on the ground, elevated antennas, etc., involve extremely complicated functions necessitating very tedious calculations. As a result graphical solutions have been available for only a few of the more simple cases. In the graphical solution which was presented at the March 18th FM [frequency modulation] hearing the complicated functions have been calculated once and for all and are available in the form of graphs.

11-YEAR SUNSPOT CYCLE RECORDS

The 11-year sunspot cycle recording program mentioned in the fifth annual report was begun in the spring of the year 1938. Since that time continuous 24-hour automatic recordings of field intensities and noise have been made on from 15 to 20 broadcast stations by the Commission's monitoring stations. In view of the fact that measurements of field intensities and noise were being recorded simultaneously, it became possible to greatly facilitate the analysis of data by adjustments in the equipment in the field so that average field intensities are now recorded rather than the peak field intensity.

There are now on hand at the Washington office approximately 5,500 24-hour records of sky wave field intensity and some 3,000 similar records of atmospheric noise on frequencies throughout the broadcast band. More than half of these data were analysed during the year, most of this work being done at the field offices and the remainder at Washington.

DEGREE OF FREQUENCY STABILITY ANALYSIS

Because of the importance of technical progress whereby an increasingly greater portion of the available radio spectrum may be usefully employed, investigation was made to secure a general picture of the results being obtained by radio stations in meeting the requirements of frequency stability specified in the Cairo and Havana tolerance tables.

The data collected consisted of measurements of frequency stability made during a period of 2 years on stations in the United States and other countries. Included in the data were some 20,000 observations made on approximately 1,000 land stations and some 42,000 made on approximately 600 fixed stations.

7. PUBLICATIONS

As a convenience, most of the detailed statistical data which has heretofore been appended to the Commission's annual reports is, in the case of this year's figures, being printed separately in a statistical yearbook. The latter compilation of charts, graphs, and tables includes even more recent statistics than for the fiscal year which ended 6 months ago. As is the procedure with the textual annual report, the supplemental "Statistics of the Communications Industry in the United States" is sold by the Superintendent of Documents.

Volume 6 of the "Federal Communications Commission Reports," covering the period July 1, 1938, to February 28, 1939, and containing about 135 decisions of the Commission, was being printed by the Government Printing Office at the close of the fiscal year. Compilation of volume 7 of these reports had been started and will cover the period from March 1, 1939, to February 29, 1940, containing approximately 135 decisions of the Commission. These, too, will be sold by the Superintendent of Documents.

During the past fiscal year the Commission made available its first printed general information pamphlet, "An ABC of the FCC." Containing slightly more than a dozen pages, this pocket-size compilation of questions and answers supplies fundamental facts about the Commission and its work. It is obtainable upon request to the Commission.

In connection with its decisions and other activities, the Commission issued numerous public notices, press releases, and general information releases. Important decisions relating to new or changed rules and regulations were ordered printed. A list of the Commission's current printed matter sold by the Superintendent of Documents will be found in the statistical chapter of this report.

Technical advances in the radio art permitted a number of important alterations in the rules of the Commission during the year. Among these was adoption of the new rules authorizing operation of high-frequency broadcast stations employing FM (frequency modulation) on a commercial basis. These new rules were adopted after extensive public hearings and their substance is discussed more fully elsewhere in this report. Because the general rules covering broadcasting were made applicable also to this class of broadcast station, the new high-frequency broadcast rules and the standard-broadcast rules have been combined under a single title, "Part 3—Rules Governing Standard and High-Frequency Broadcast Stations." At the close of the year part 3, as augmented, was in the process of reprinting.

Rules governing the operation of television stations were revised after hearing, and after a further hearing again amended, so that at the end of the year television operation remained upon an experimental basis. (See discussion elsewhere in this report.) The provisions applicable to television are now contained in part 4 of the Commission's Rules and Regulations.

"Part 7—Rules Governing Coastal and Marine Relay Services (revised to November 14, 1939)" and "Part 8—Rules Governing Ship Service (revised to November 14, 1939)" were amended since those rules appeared in pamphlet form, and at the close of the fiscal year were in process of final revision, looking to a complete reprint.

"Part 31—Uniform System of Accounts, Class A and Class B Telephone Companies," and "Part 32—Units of Property; Telephone Companies," at the close of fiscal year were being printed in a single pamphlet.

A comparative reference table was compiled and printed in the August 4, 1939, issue of the Federal Register to facilitate reference to the rules of the Commission under the new numbering system put into effect July 15, 1939, which was adopted to comply with the Code of Federal Regulations.

In the effort to make Commission rules currently and readily available, there was inaugurated a system of releasing loose-leaf amendment sheets for substitution in the single volume of rules or in the pamphlet parts. Due to lack of appropriations, these substitute pages were available only for limited distribution. However, single copies may be secured upon individual request. The material is so arranged that it can be duplicated readily by private means.

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CHAPTER III

Legislation

1. RECOMMENDATIONS TO CONGRESS
2. REPORTS TO CONGRESS
3. NEW LEGISLATION
4. REPORT OF THE SECRETARY

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CHAPTER III—LEGISLATION

1. RECOMMENDATIONS TO CONGRESS

Recommendations to Congress with respect to new legislation supplementing the Communications Act were submitted during the year. The subject matter of these recommendations is reflected in the ensuing comment. The Commission makes specific proposals for legislation when the need therefor arises, particularly upon the completion of special studies which merit such recommendation. Accordingly, this report makes no specific recommendation for additional legislation at this time.

2. REPORTS TO CONGRESS

In response to S. Res. 95, 75th Congress, 2d Session, approved June 19, 1939, which authorized an investigation of the telegraph industry by the Interstate Commerce Committee of the United States Senate, the Commission furnished a report on the domestic aspects of telegraph merger and a supplemental report on the international phases of this problem. These findings were presented to a subcommittee of the Interstate Commerce Committee headed by Senator Burton K. Wheeler, of Montana. [The subject is covered elsewhere in this report.] The Commission continued to cooperate with this subcommittee in the furnishing of statistical data and in lending its facilities and records as requested. Also, representatives of the Commission appeared and gave testimony at the subcommittee hearings.

3. NEW LEGISLATION

The Commission functions under the Communications Act of 1934, as amended. Following is a brief review of acts of Congress during the fiscal year 1940 which amended this basic law and conferring additional authority on the Commission.

The Commission submitted to Congress near the close of the fiscal year a recommendation that section 4 (f) of the Communications Act be amended to provide that shipowners who request overtime service by inspectors of the Commission for the purpose of obtaining certificates of inspection for their vessels, pursuant to the provisions of section 360 (b) of the act, shall be required to pay for such overtime service at rates to be fixed by statute. This matter was pending at the close of the year.

Section 602 (e) relating to a study of radio requirements necessary or desirable for safety purposes for ships navigating the Great Lakes and inland waters of the United States, was amended by Public, No. 441, 76th Congress, 3d Session (H. R. 7863), approved March 18, 1940, so as to extend until January 1, 1941, the time for filing the Commission's report and recommendations. [This subject is discussed elsewhere in this report.]

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4. REPORT OF THE SECRETARY

For the fiscal year ending June 30, 1940, there was appropriated \$1,838,175. This sum is accounted for as follows:

"Salaries and Expenses":	
Personal services, District of Columbia.....	\$1, 146, 917
Personal services, field.....	486, 030
Supplies and materials.....	27, 991
Gasoline and oil.....	3, 573
Storage and care of vehicles.....	5, 079
Communication service.....	19, 014
Travel expense.....	36, 741
Carfare.....	1, 347
Transportation of things.....	3, 597
Stenographic reporting.....	6, 427
Heat, light, power, and water.....	4, 500
Rent expense.....	14, 151
Repairs and alterations.....	3, 825
Special and miscellaneous.....	2, 280
Equipment.....	38, 528
	<u>1, 800, 000</u>
"Printing and Binding".....	<u>25, 000</u>
"Study of Radio Requirements of Inland Waterways":	
Personal services, District of Columbia.....	7, 007
Supplies and materials.....	183
Communication service.....	80
Travel expense.....	4, 741
Reserve unexpended.....	1, 164
	<u>13, 175</u>
Total.....	1, 838, 175

At the close of the fiscal year, the Commission had 434 employees in Washington and 191 in the field. With few exceptions, the Commission personnel is under Civil Service.

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CHAPTER IV

Telephone and Telegraph

1. GENERAL REGULATION
2. TELEGRAPH INVESTIGATION
3. TELEPHONE RATE REDUCTIONS
4. RATES AND TARIFFS
5. SUPERVISION OF ACCOUNTS
6. FINANCIAL AND OTHER STATISTICAL DATA
7. WIRE TELEPHONE FACILITIES
8. WIRE TELEGRAPH FACILITIES

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CHAPTER IV—TELEPHONE AND TELEGRAPH

1. GENERAL REGULATION

The Commission is charged with the regulation of all telephone and telegraph companies doing business as common carriers in interstate or foreign communication. Such authority extends over wire and radio facilities both. The discussion in this chapter concerns rates and tariffs, supervision of accounts, complaints and investigations, extension of facilities, and technical developments in both fields. Matters relating to the licensing of these carriers will be found in a separate chapter of the report.

War conditions in Europe have brought about increased work in connection with international rates and services. In addition to regular supervision and reports on these matters, special studies have been made and particular data assembled.

2. TELEGRAPH INVESTIGATION

Pursuant to request of a subcommittee of the Interstate Commerce Committee of the Senate, acting under Senate Resolution 95 of the Seventy-Sixth Congress, the Commission conducted an investigation into conditions of the telegraph industry and submitted its report of findings and recommendations in two parts. That portion of the report covering the domestic service was transmitted December 23, 1939, and the part relating to the international field was submitted February 21, 1940.

On the basis of its findings the Commission recommended to Congress the enactment of legislation to permit consolidation of telegraph carriers into one or more unified systems for economic and national-defense reasons.

It was suggested that this legislation be broad in scope, leaving to the appropriate authority the administration of the details important to the consummation of any particular plan which may be proposed. While the recommendation was that the legislation permitting consolidations be in general terms, it was requested that Congress indicate its specific intent with respect to the following subjects: The protection of labor; the adoption of sound and simplified corporate and financial structures; the retention of the American character of the communications system by prohibition against the ownership or voting of stock by aliens, or the holding of any managerial office by an alien; and the requirement for the abandonment of services or facilities in those situations in which the Commission finds them to be no longer necessary.

It was further suggested that the creation of a single international carrier would provide a more effective device for securing equitable communication arrangements with foreign administrations.

3. TELEPHONE RATE REDUCTIONS

Effective May 1, 1940, the American Telephone & Telegraph Co. reduced rates on long-distance telephone calls in excess of 420 miles, resulting in an estimated annual saving to the public of \$5,300,000. This reduction was effected as a result of conferences between the Commission and the company without the necessity of legal proceedings.

An indicated saving of \$850,000 a year on interstate message toll service is provided in revised rate schedules of the New York Telephone Co. and the New Jersey Bell Telephone Co., which became effective December 1, 1940.

A new and reduced schedule of interstate message toll telephone rates for service in the Southeastern States over the lines of the Southern Bell Telephone & Telegraph Co. was filed with the Commission in June, to take effect August 1, 1940. Similarly negotiated, this reduction amounts to approximately \$525,000 a year.

The Bell Telephone Co. of Pennsylvania, the Diamond State Telephone Co., and the New Jersey Bell Telephone Co. reduced their toll message service rates between points in Pennsylvania, Delaware, and New Jersey, effective May 1, 1940, with annual saving of \$91,400 to customers in those States.

Reductions made since the establishment of the Commission aggregate nearly \$30,000,000 a year. If the reductions achieved since 1934 were computed on a cumulative basis, the savings to telephone users will have amounted to almost \$100,000,000 by the end of 1940, without taking into consideration savings on increased traffic.

4. RATES AND TARIFFS

RATE SCHEDULES

At the close of the fiscal year 361 communication carriers had tariffs and concurrences on file with the Commission, an increase of 131 over June 30, 1939. Filed during the year were 23,330 tariffs containing changes in rates, regulations, practices, and classifications of service, or establishing new communication services or of concurrences. Of this total, 12,679 related to telephone services; 8,064 to telegraph services, and 2,587 to both telephone and telegraph services. A total of 144 tariffs were rejected for failure to conform to statutory requirements.

These schedules are subject to correction of rates and regulations therein which are unjustly discriminatory or otherwise unlawful. Numerous irregularities in rates were corrected or eliminated through correspondence with carriers. In this connection, 1,528 letters were written as contrasted with less than 700 such letters written in the previous year.

Special and successful effort was made to secure the filing of schedules by carriers that had not filed before, particularly public ship licensees and Alaskan radio licensees engaging in public service. Effort was also made to obtain concurrences from carriers engaging in joint "through" service with other carriers.

Tariff schedules are open to public inspection at the Washington offices of the Commission, and there continues to be increased reference to these records by the public.

RATE CHANGES

Various rate reductions were effected during the fiscal year as a result of negotiations by the Commission. In addition to those mentioned, these cases were recorded:

Private-line service.—During the fiscal year the American Telephone & Telegraph Co. and the associated Bell System companies reduced rates for private-line services (including Morse, teletypewriter, telephone, press, and Government) with a resultant annual saving to the public estimated to be in excess of \$1,200,000. Comparable reductions were made by The Western Union Telegraph Co. in its private-line service rates, with annual saving to the public of approximately \$130,000.

Program transmission service.—Effective September 11, 1939, the American Telephone & Telegraph Co. reduced rates for overtime on schedule A program transmission service where arranged for in advance, with an estimated annual saving of \$75,000 to the users of such service.

Message toll telephone service.—Effective September 1, 1939, the American Telephone & Telegraph Co. rearranged routings to points in Mexico, resulting in annual savings to the public of approximately \$60,000.

RATES FOR GOVERNMENT MESSAGES

As required under the Post Roads Act of 1866, as amended, the Commission promulgated its annual order fixing rates for United States Government messages handled by companies subject to the act and to certain cable-landing licenses. The carriers involved requested an increase in the rates for the messages handled. After a hearing the Commission authorized an increase of from 40 to 60 percent in the rates applicable to Government messages for the period January 1, 1940, to June 30, 1940. By a subsequent order, the increased rates were continued for the current fiscal year.

INVESTIGATIONS AND SUSPENSIONS

Pacific coast telephone rates.—In the 1939 annual report mention was made of a complaint filed with the Commission by the Department of Public Service of the State of Washington against the rates, charges, and practices of The Pacific Telephone & Telegraph Co. applicable to interstate service between points within and without the State of Washington. On its own motion, the Commission issued its order instituting an investigation into the rates, charges, and practices, with respect to the interstate communications service furnished by The Pacific Telephone & Telegraph Co. and its two wholly owned subsidiaries, Southern California Telephone Co. and Bell Telephone Co. of Nevada, which materially broadened the scope of the matter. Hearings were held in Seattle and San Francisco, and the record was closed on April 6, 1940. Respondents submitted their brief containing proposed findings of fact and conclusions in May 1940. A proposed report, adopted by the Commission on August 15, 1940, held the rate scale to be "unjust and discriminatory."

Foreign special contract press service.—Charges, practices, classifications, and regulations for and in connection with foreign special contract press service from London, England, to New York,

N. Y., were the subject of investigation and hearing. Decision was pending at the close of the fiscal year.

Multiple address press service.—Multiple address press charges, practices, classifications, and regulations applicable to service to outlying territories and possessions of the United States were the subject of investigation and hearing. The matter was disposed of by the carrier involved filing revised tariff schedules placing the territories and possessions on a parity with the continental United States and Canada.

Reforwarding of messages.—Regulations and practices of telegraph carriers concerning the reforwarding of telegraph messages were the subject of investigation and hearing. The matter was pending decision at the end of the year.

Ship telephone service on Great Lakes.—Tariff schedules of two carriers containing charges and regulations with respect to the furnishing of radiotelephone service to and from vessels on the Great Lakes were suspended and ordered investigated. Hearings were held and the matter was pending decision at the close of the fiscal year. The carriers meanwhile are operating under accounting orders requiring the maintenance of records to account for all charges collected at rates that were suspended to facilitate determination of the differential, and for other purposes.

Interzone telephone rates.—The action of one large telephone carrier in withdrawing certain rates for interstate telephone service to and from points in the vicinity of a large metropolitan center, and the establishment by such carrier of an alleged local exchange service through the alleged extension of the local service area of the metropolitan center for a considerable distance to include certain interstate points was investigated. Decision was pending.

Common carrier as agent of another.—The Commission suspended schedules of charges which purported to discontinue charges and regulations of three carriers on the ground that such carriers were acting as agent of a fourth carrier and not as carriers, as such, in the course of furnishing communication services to the public. The proceeding was dismissed when the suspended schedules were voluntarily withdrawn.

Increased rates for multiple address press service.—The Commission suspended schedules of charges which proposed to increase charges for multiple address service to the press on certain holidays. The proceeding was dismissed when the carrier voluntarily filed revised schedules withdrawing the proposed increased rates.

New domestic telegraph carriers.—The Commission entered upon an investigation to determine whether it would be in the public interest to permit a new telegraph carrier to enter the domestic telegraph field in competition with existing carriers serving the same places. The matter was pending proposed findings.

Discriminatory rates (local).—At the instance of the Portland (Oreg.) Chamber of Commerce, the Commission investigated possible discrimination against that city in the matter of certain transpacific rates. A hearing on this matter has been indefinitely suspended, at the request of the Portland Chamber of Commerce, pending the application of a carrier to construct and operate a radiotelegraph station in Portland and thereby remove the alleged discrimination.

Urgent cable rates.—The Commission entered upon an investigation of the reasonableness of the ratio between rates for "urgent" and "ordinary" messages between the United States and overseas points. Proposed findings of the Commission, promulgated prior to the close of the fiscal year, were to the effect that the existing ratio is reasonable.

Timed wire service.—The Commission investigated the lawfulness of the TWS [timed wire service] classification of domestic telegraph messages. Proposed findings, promulgated prior to the close of the fiscal year, were to the effect that such classification is unlawful.

Restriction of rates to individuals.—The Commission investigated and suspended message-telegram service schedules of certain telegraph carriers, which schedules published rates lower to certain individuals than to the general public. The proceeding was dismissed upon the filing of revised schedules of charges discontinuing the practice.

Payment of telegraph charges in stamps.—The Commission, on September 12, 1940, approved a proposal by the Western Union Telegraph Co. to sell and accept private stamps in payment of telegraph service.

Telegraph pick-up and delivery services.—The Commission has ordered an investigation into the practices of the telegraph carriers with respect to the pick-up and delivery of messages, and the studies were under way at the close of the fiscal year.

Qualified toll-line service.—The Commission investigated schedules of qualified toll line service rates of certain telephone companies. It was found that additional charges, contained in contracts between the telephone companies but not provided for in the tariff schedules filed with the Commission, were being made for service via certain routes. The proceedings were dismissed upon the filing of revised tariff schedules.

Miscellaneous.—Enforcement of the statutory provisions which declare rebating unlawful and which prohibit common carriers from engaging in service without tariff schedules on file with the Commission has been carried out by field investigations of the records of carriers, followed by indictments in certain cases. Fines were assessed in two cases and other investigations are pending.

5. SUPERVISION OF ACCOUNTS

Among the Commission's activities in the matter of accounting regulations were the following:

Uniform system of accounts—wire telegraph and ocean cable carriers.—On October 29, 1940, the Commission adopted a revised uniform system of accounts for wire telegraph and ocean cable carriers, to go into effect January 1, 1942. The new system, which conforms to Government principles, will supplant one in use since 1914, and which has been found inapplicable to many modern operations.

Uniform system of accounts—radiotelegraph carriers.—A uniform system of accounts for radiotelegraph carriers having average annual operating revenues in excess of \$50,000 was prescribed by the Commission in June 1939 and became effective January 1, 1940.

Restatement of plant accounts on basis of original cost.—Considerable progress has been made by telephone carriers in the restatement of their plant accounts on the basis of original cost as prescribed by the Commission. This matter and that of appropriate disposition of

amounts recorded in plant-acquisition adjustment accounts as a result of such restatements have been important features of the cooperative activities between State and Federal regulatory bodies.

Depreciation.—The Commission has been cooperating with the Committee on Depreciation of the National Association of Railroad and Utilities Commissioners by assisting in the preparation of a report on depreciation. An effort is being made to bring about consistency in the treatment of depreciation to the end that the same elements which are taken into consideration in determining the annual depreciation expense includible in the cost of furnishing service shall be given corresponding consideration in determining the amount of accrued depreciation deductible in establishing the base upon which a fair rate of return is allowed to be earned. The matter is important to the public from the standpoint of its effect upon rates.

In accordance with section 220 (b) of the act, classes of depreciable plant were prescribed for radiotelegraph carriers in the Uniform System of Accounts for Radiotelegraph Carriers mentioned above.

Relief and pensions.—Telephone, telegraph, cable, and radiotelegraph carriers proposed for welfare purposes during the current year expenditures of \$55,000,000 to \$60,000,000. These provisions include large increases in certain items aggregating over \$16,000,000 annually, which have necessitated special consideration.

Financial, actuarial, and accounting data have been prepared in Docket 5188 in connection with such proposed increased annual charges in the amount of approximately \$10,000,000, for the purpose of determining the reasonableness of such increases. Decision in this matter was under consideration by the Commission at the close of the fiscal year.

Analyses have continued with respect to filings of all communication carriers in compliance with a standing order of the Commission relating to changes in relief and pension plans and accounting practices. Pending decision in Docket No. 5188, controversial points arising from these analyses remain unsettled.

FIELD EXAMINATIONS

Field examinations to enforce accounting regulations and to assemble necessary factual data have been confined largely to carriers located in New York City, where the Commission maintains its only accounting field office.

Two general examinations were made of the accounts of ocean-cable carriers and two major field examinations were in progress at the close of the year. Nine special examinations were made of certain telephone and telegraph carriers, and data with respect to financial and operating conditions in the telegraph industry were compiled for inclusion in the Commission's report on the telegraph industry noted elsewhere in this report.

The Commission has been without sufficient funds to provide an adequate field force to examine the records of carriers for the purpose of testing compliance with the prescribed accounting rules or for the other regular and continuing duties contemplated by section 220 of the act (relating to the accounts and records of communication carriers) and by section 215 of the act (relating to the accounts and records of affiliated companies including manufacturing

subsidiaries and others furnishing equipment, supplies, or services, the cost of which affects the rates charged for communication service).

It is important to effective regulation to be able to gather at first hand the information and facts upon which the Commission must base decision. Otherwise, the Commission is forced to rely upon ex parte statements made in response to questionnaires and inquiries.

6. FINANCIAL AND OTHER STATISTICAL DATA

ANNUAL AND MONTHLY REPORTS

Annual reports for the calendar year 1939 (containing comprehensive information of a financial and statistical nature) were filed by 167 companies. Of this number, 91 were telephone carriers, 14 were wire-telegraph or ocean-cable carriers, 19 were radiotelegraph carriers, and 43 were holding companies. Monthly reports were filed during this calendar year by 111 companies. Of this number, 94 were telephone carriers, 8 were wire-telegraph or ocean-cable carriers, and 9 were radiotelegraph carriers. A few carriers not subject to section 219 of the act, which requires the filing of annual reports, file such reports voluntarily and a considerable number of carriers file monthly reports voluntarily.

Only those telephone carriers having average annual operating revenues in excess of \$50,000 were required to file annual reports, and only those having such revenues in excess of \$250,000 were required to file monthly reports. All telegraph carriers subject to Commission jurisdiction were required to file annual reports, but only those having average operating revenues in excess of \$50,000 were required to file monthly reports. Telephone carriers having revenues in excess of \$1,000,000 were required to file additional monthly reports showing various income and balance-sheet items.

Annual reports for the calendar year 1939, relating to traffic damage claims, were filed by 111 carriers engaged in telegraph service by wire or radio, or various industries incidently performing radiotelegraph services.

STATISTICAL COMPILATIONS AND PUBLICATIONS

The following regularly published statistical summaries were issued by the Commission during the fiscal year:

Selected financial and operating data from the annual reports of telephone carriers for the year ended December 31, 1938.

Selected financial and operating data from the annual reports of telegraph, cable, and radiotelegraph carriers for the year ended December 31, 1938.

Selected financial data from the annual reports of holding companies for the year ended December 31, 1938.

Intercorporate relations of carriers and controlling companies, 1938, including index to companies.

Salary report of telephone and telegraph carriers and holding companies, 1938.

Summary of the monthly reports of large telephone carriers in the United States.

Operating data from the monthly reports of telegraph carriers.

Telephone hand-set charges and changes since January 1, 1939.

Various other statistical studies were made during the year relating to such vital matters as international traffic and the status of domestic telegraph carriers mentioned elsewhere in this report.

COMPARATIVE DATA RELATING TO COMMON CARRIERS

The following table shows important financial and operating data concerning 74 class A and 17 class B telephone carriers for the calendar year 1939, with comparative data for 1938. It includes returns from two carriers located outside of the continental limits of the United States. Similar information pertaining to 9 telegraph, 5 cable, and 19 radiotelegraph carriers is shown in an additional table. Comprehensive statistical data relating to common carriers and controlling companies subject to Commission jurisdiction will be found in the separate statistical yearbook which supplements this textual report. A considerable portion of the information shown in the yearbook was formerly included in the annual report appendices.

Telephone carriers

	1939	1938	Increase or decrease	
			Amount	Ratio percent
Number of carriers.....	1 91	92		
Investment in telephone plant.....	\$4,909,103,693	\$4,798,794,098	\$110,309,595	2.30
Capital stock.....	\$4,299,311,729	\$1,292,434,374	\$6,877,355	.16
Funded debt.....	\$1,074,375,300	\$1,033,504,535	\$40,870,765	3.95
Depreciation reserve.....	\$1,375,794,730	\$1,321,458,355	\$54,336,375	4.11
Total surplus.....	\$381,047,645	\$303,439,869	\$17,607,776	4.84
Operating revenues.....	\$1,201,427,364	\$1,143,287,173	\$58,140,191	5.09
Operating expenses.....	\$804,246,429	\$786,457,139	\$17,789,290	2.26
Operating taxes.....	\$163,979,026	\$152,112,021	\$11,867,005	7.80
Net operating income.....	\$233,202,103	\$204,690,908	\$28,511,195	13.03
Total interest deductions.....	\$52,852,140	\$54,269,547	\$1,417,407	2.61
Dividends declared.....	\$346,525,984	\$338,611,226	\$7,914,758	2.34
Miles of wire.....	89,797,535	87,592,000	2,205,535	2.52
Number of telephones.....	18,333,043	17,568,915	829,128	4.74
Number of employees at end of December.....	287,333	286,840	493	.17
Total compensation of employees.....	\$511,892,396	\$503,062,615	\$8,829,781	1.76

^d Deficit or other reverse item.

¹ Excludes three carriers merged with others and includes two additional carriers.

NOTE.—The above amounts represent combined totals of the companies included, and do not give effect to elimination of intercompany items.

Telegraph, cable, and radiotelegraph carriers

Item	1939	1938	Increase or decrease	
			Amount	Ratio percent
Number of carriers.....	1 32	34		
Investment in plant and equipment.....	\$534,474,851	\$537,843,572	^d \$3,368,721	^d 0.63
Capital stock.....	\$165,051,257	\$165,189,841	^d \$138,584	^d .08
Unmatured funded debt.....	\$88,206,275	\$111,026,210	^d \$22,819,935	^d 29.55
Reserve for accrued depreciation.....	\$160,021,984	\$168,552,579	\$2,469,405	1.48
Total corporate surplus.....	\$44,232,698	\$67,104,086	^d \$22,961,388	^d 51.17
Operating revenues.....	\$140,455,654	\$133,650,346	\$6,805,308	5.09
Operating expenses.....	\$121,729,571	\$120,074,182	\$1,655,389	1.38
Operating taxes.....	\$8,400,260	\$7,955,671	\$444,589	5.59
Operating income.....	\$9,739,095	\$5,109,741	\$4,629,354	90.60
Total interest deductions.....	\$8,489,291	\$8,553,738	^d \$64,447	^d .75
Dividends declared.....	\$420,855	\$542,210	^d \$121,355	^d 22.38
Miles of wire.....	2,436,139	2,428,245	7,894	.33
Estimated number of revenue messages transmitted.....	209,258,068	205,382,652	3,875,416	1.89
Number of employees at end of December.....	66,022	65,573	449	.68
Total compensation of employees.....	\$84,245,196	\$82,793,030	\$1,452,165	1.75

^d Deficit or other reverse item.

¹ Excludes two carriers which discontinued operations.

NOTE.—The above amounts represent combined totals of the companies included, and do not give effect to elimination of intercompany items.

7. WIRE TELEPHONE FACILITIES

APPLICATIONS

The 76 applications for extension and consolidation of lines or facilities from telephone carriers handled during the year include those for (1) acquisition and construction under section 214; (2) the supplementing of existing facilities under the second-proviso clause of section 214 (a); and (3) authority to consolidate under section 221 (a).

Wire telephone applications approved by the Commission from July 1, 1934, to June 30, 1940

Period	Number of applications	Estimated construction cost	Miles of cable placed	Miles of open wire placed
July 1, 1934, to June 30, 1935	7	\$1,145,851	¹ 234.3	---
July 1, 1935, to June 30, 1936	15	275,625	24	475
July 1, 1936, to June 30, 1937	50	5,551,702	206	17,045
July 1, 1937, to June 30, 1938	45	3,921,000	400	1,212
July 1, 1938, to June 30, 1939	45	6,960,123	² 646	1,967
July 1, 1939, to June 30, 1940	72	9,070,952	³ 1,209.2	3,501
Total	234	26,925,253	2,818.5	24,200

¹ Of which 94.5 miles is coaxial cable containing 2 coaxial units.

² Of which 195 miles is coaxial cable containing 4 coaxial units.

³ Of which 42 miles is coaxial cable containing 4 coaxial units.

ACQUISITIONS UNDER SECTION 214

Among the applications for authority to acquire and operate facilities were the following grants by the Commission:

The New England Telephone & Telegraph Co., to acquire toll facilities of the Central Telephone Co. of Vermont.

The American Telephone & Telegraph Co., to acquire the property of the American Telephone & Telegraph Co. of Massachusetts.

The Southwestern Associated Telephone Co., to acquire the property of the Haskell Telephone Co.

SUPPLEMENTING EXISTING FACILITIES UNDER SECTION 214

The second proviso of section 214 (a) gives the Commission power to authorize the supplementing of existing facilities without regard to other provisions of the section requiring hearings, notices, etc. During the year 75 applicants requested authority to supplement existing facilities. Seventy-one were analyzed and approved by the Commission, one of which had been filed at the end of the 1939 fiscal year. Two applications were returned to the applicants. Action on three applications was pending.

Most of these applications were from the Bell Telephone System, only six being filed by other companies. The expenditures for construction in the individual projects approved ranged from a few thousand dollars to \$2,815,200, with a total of \$9,070,952. This represents an increase over any previous year—in number of applications, total expenditure, and miles of toll cable constructed.

In connection with these projects, it is the policy of the Commission to require periodic construction and progress reports and a full report on their completion. The reports are received and analyzed by the engineering and accounting departments.

PETITIONS TO CONSOLIDATE UNDER SECTION 221 (a)

Section 221 (a) of the act provides that telephone carriers desiring to consolidate their properties may file with the Commission a petition requesting a certificate to the effect that the proposed consolidation, merger, acquisition, or control of the property of one or more telephone companies by another will be of advantage to the persons to whom service is to be rendered, and in the public interest. Such a certificate exempts the carriers from provisions of the antitrust act.

A joint petition was filed by the Michigan Bell Telephone Co. and the Eaton County Telephone Co. on March 31, 1939, requesting the Commission to certify that the proposed acquisition by the Michigan Bell Telephone Co. would be of advantage to the persons to whom service would be rendered and in the public interest. A public hearing upon this petition was held on June 12, 1939. The petition was granted on July 12, 1939, and a certificate was issued.

The Michigan Bell Telephone Co. filed a petition requesting the Commission to certify that the proposed acquisition by the Michigan Bell Co. of the Hillandale Telephone Co. would be of advantage to the persons to whom service is to be rendered and in the public interest. The Michigan Bell Telephone Co. operated an exchange at Benton Harbor, Mich. The properties of the Hillandale company consisted of rural lines in the vicinity of Benton Harbor which connected with the lines of the Michigan Bell company's Benton Harbor exchange at or near the city limits. Under the then existing arrangements, the Hillandale company was responsible for the rendering of service from its subscribers to the exchange area of the Michigan Bell company, the latter being responsible for rendering the remaining portion of the service. The Commission found, after a public hearing, that the proposed acquisition would be of advantage to the persons to whom service is to be rendered and in the public interest. The petition was granted and a certificate was issued.

TECHNICAL DEVELOPMENTS IN WIRE TELEPHONE

During the past calendar year the Commission authorized about \$10,000,000 worth of new telephone line construction. Some of the important technical developments and improvements achieved in wire telephone communication during the fiscal year are here listed:

New York-Philadelphia coaxial system.—New 3-megacycle repeater equipment was installed at 5-mile intervals along the route. Experimental television modulating equipment was installed in both New York and Philadelphia. Tests were made of television transmission over the 190-mile coaxial loop from the Bell Laboratories in New York to Philadelphia and return, using special terminal equipment which gave greater brightness, range, and definition than the usual commercial television receiver. Film pictures were employed with 441-line scanning, 30 frames interlaced. By switching the coaxial cable loop in and out, comparison was made of transmission over the coaxial loop with local transmission. To casual observation there was no appreciable difference, although in test patterns and in a few of the pictures a slight difference could be detected by the expert. Further refinement and testing of the system is being carried on.

During the National Republican Convention at Philadelphia beginning June 24, 1940, television programs were transmitted by means of coaxial and wire cable conductors from Philadelphia to New York, where the television programs were broadcast via radio by the National Broadcasting Co. From Convention Hall to the American Telephone & Telegraph Co.'s Long Lines Building at Philadelphia, regular cable pairs were used. As such wire circuits do not transmit television signals as readily as do coaxial conductors, it was necessary to install repeaters at 1-mile intervals. From the Long Lines Building in Philadelphia to the Bell Telephone Laboratories in New York, the New York-Philadelphia coaxial cable was used. From the laboratories to Radio City a new type of cable was installed which has the advantage of requiring no intermediate repeaters for the distance involved.

Stevens Point-Minneapolis coaxial cable.—The construction of this cable, which was started last year, is progressing satisfactorily and it was expected that its entire 195 miles will be completed and placed in service in December 1940.

Washington-Baltimore coaxial cable.—The American Telephone & Telegraph Co., the Chesapeake & Potomac Telephone Co., and the Chesapeake & Potomac Telephone Co. of Baltimore City filed a joint application for the installation of two cables between Baltimore and Washington (42 miles). One cable will contain four coaxial units together with a number of quadded and nonquadded wire conductors. A second cable containing a larger number of quadded conductors will be simultaneously plowed into the ground. The wire conductors will be used for type K carrier (12-channel) systems, while one pair of the coaxial conductors may provide for 480 telephone channels and the second pair will be set aside for emergency use.

Carrier systems.—There has been considerable activity in the development of new and the improvement of existing carrier telephone systems in this country in the past year. A number of type K carrier installations have been made on cable, a few of which are on the following cables: Boston-New York, St. Louis-Joplin, Mo., and Glens Falls-Albany, N. Y.

Crossbar switching system.—During the year, important developments were made in the crossbar dial-telephone central office switching system. A number of installations of this system are now being made in the metropolitan areas of New York and Washington, D. C.

Weather announcing machine.—Machines have been developed and installed in telephone central offices in the New York metropolitan area, Chicago, Baltimore, Washington, and Detroit. With this machine, telephone subscribers may receive forecasts of weather conditions by dialing a particular number. Information for these announcements is supplied hourly by local officers of the Weather Bureau over a direct teletype connection. The information is then transmitted by means of an operator's voice to a microphone, from which it is recorded on a magnetic tape. This pattern remains on the tape and can be "picked up" electrically and transmitted to subscribers many thousands of times until erased, which is done by an operator pushing a switch and saturating the tape with a heavy magnetic field.

8. WIRE TELEGRAPH FACILITIES

APPLICATIONS

The number of applications for wire telegraph certificates under section 214 of the act was small during the fiscal year. All applications requested authority for the lease of telegraph circuits. There were no applications involving new construction. Approximately 65 miles of circuit were authorized to be leased for permanent use and approximately 163 miles were authorized for temporary use.

TECHNICAL DEVELOPMENTS IN WIRE TELEGRAPH

The carrier telegraph system has been improved notably by the adaptation of frequency modulation. The principle of frequency modulation has been developed to provide an important increase in the reliability of carrier current operation with no enlargement of the frequency band width required for telegraph working.

Automatic facsimile equipment.—A new type receiving machine for installation in central offices has been designed which permits complete automatic reception of telegrams. The new unit provides for the use of a large roll of recording paper continuously fed as messages are recorded. Received messages are cut off from the roll automatically and dropped on a conveyor system for distribution to the sending trunk channel. The recording paper, known as "Teledeltos," has been greatly improved in quality during the year.

Automatic switching of teleprinter circuits.—A system has been developed so that a relatively small number of trunks are utilized to provide direct tie-line service to many patrons in a distant city. A speedier service results through the elimination of an intermediate relay at the city with the tie-line connections.

Varioplex circuit.—Continuing engineering work in development has resulted in an improved system which operates on a single channel of multiplex circuit. This has resulted in the expansion of varioplex facilities to smaller cities, and as a result telemeter service has been made available to many smaller cities during the year.

Metallic operation.—A large number of principal trunk circuits between large cities have been converted to "metallic" operation, thereby making these circuits immune to disturbances from parallel power lines and magnetic storms.

Channel repeaters.—A number of "channel repeaters" have been installed to permit rapid setting up of emergency printer circuits when abnormal traffic conditions prevail.

Reperforator-switching system.—Development to provide a more accurate, rapid, and efficient method of relaying telegrams through large central offices has continued, the installation of the system being under way at one of the large relay offices. Supplementary development work has adapted the system for "private-line" switching in patrons' offices.

Semiautomatic system.—An experimental installation of a semi-automatic system for improving the handling of relay traffic is under observation in New York City.

PROSECUTION FOR VIOLATION

It was necessary during the fiscal year for the Commission to turn over to the Department of Justice a case involving the unauthorized extension of a wire telegraph line between Baltimore and Belcamp, Md.; a case of rebating to a customer at Philadelphia; and a case involving the rendition of service at Breezy Point, Minn., without having proper tariffs on file. Convictions were had in all three cases.

EFFECT OF WAR ON CABLES

The European war has had a serious effect on the international communications services of the American cable companies. The direct circuits of Western Union & Commercial Cable between New York and Emden, Germany, were interrupted in September 1939 by the severance of the Deutsche Atlantische Telegraphengesellschaft cable between the Azores and Emden. The cutting of the Italcable between the Azores and Malaga, Spain, interrupted cable communications to Italy. Cable service to Belgium and Holland, which formerly was routed via leased cables between London and these countries, has been interrupted, as well as direct cable service between the United States and Havre and Paris.

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CHAPTER V

Standard Broadcast

1. NORTH AMERICAN REGIONAL BROADCASTING AGREEMENT
2. INVESTIGATION OF CHAIN BROADCASTING
3. RULES AND REGULATIONS
4. STANDARDS OF GOOD ENGINEERING PRACTICE
5. DISTRIBUTION OF BROADCAST FACILITIES
6. FOREIGN LANGUAGE BROADCAST
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CHAPTER V—STANDARD BROADCAST

1. NORTH AMERICAN REGIONAL BROADCASTING AGREEMENT

In conformity with provisions of the North American Regional Broadcasting Agreement, the Federal Communications Commission on September 11, 1940, filed with the State Department its proposed reallocation of frequencies in the standard broadcast band, to go into effect simultaneously with the pact, on March 29, 1941.

Changes necessitated by the Havana agreement will affect 777 of the 862 radio stations now operating in the standard broadcast band (550 to 1600 kilocycles) in the United States. In shifting the United States frequencies the Commission plans but minimum alteration in the present broadcast service.

Here, in general, is how the domestic shift will be accomplished:

Eighty-five stations now operating on channels of from 550 to 720 kilocycles, inclusive, will retain their present assignments.

Twenty stations operating between 740 and 780 kilocycles will move up 10 kilocycles (which is the engineering equivalent to one channel).

Twenty-six stations using from 790 to 870 kilocycles will move up 20 kilocycles (two channels).

Six hundred and fourteen stations between 880 and 1450 kilocycles will generally advance 30 kilocycles (three channels); 25 will advance 40 kilocycles (four channels).

Twenty-five clear channel stations will shift from 1460-1490 kilocycles to 1500-1530 kilocycles.

Sixty-four local stations now on 1500 kilocycles will move down one channel—to 1490 kilocycles.

Twenty-eight miscellaneous stations will undergo irregular shifts.

EFFECT ON LISTENER

The chief noticeable difference to the average listener will be that his favorite station above 730 kilocycles will occupy a slightly different place on his receiver dial—usually higher. Receivers with push-button tuning will have to have these controls readjusted for all stations higher on the dial than 720 kilocycles. Otherwise, the general tuning-in process will be no different than at present. The extent of the broadcast band remains the same and station service is unchanged.

However, the correlated shifting of the frequencies of some 100 broadcast stations in Canada, and of numerous stations in Mexico and Cuba will serve to eliminate in considerable measure the long-complained of interference from these sources, and thereby improve broadcast reception in the North American continent generally. Interference from Mexican and Cuban stations has been particularly objectionable to the rural listeners. The Havana pact contains no provision for continued operation of high-powered stations just across the Mexican border.

EFFECT ON BROADCASTER

The United States broadcaster, on his part, does not have to replace present transmission and other expensive equipment. His chief con-

cern will be to change the quartz crystals which control a station's operating frequency. Though this is a small item, it will take some time to obtain the 2,000 or more needed crystals from the comparatively few manufacturers who grind and calibrate them to order.

In carrying out the agreement, the Commission has made every effort "to preserve the broadcast structure in the United States so that minimum interference in frequency assignments would be required." Of course, blanket shifts are not possible in every instance, and a few stations have to be considered individually in their relation to the new set-up as a whole. Where a considerable change in frequency is found imperative, the Commission's engineers have striven to provide a new assignment with less potential interference than exists on the present frequency, or the licensee is afforded opportunity to increase his power to maintain substantially his present service area. In making the general reallocation it is necessary for the Commission to amend its rules governing standard broadcast stations in some technical particulars.

GENERAL EFFECT OF AGREEMENT

The practical effect of the agreement is to establish principles paralleling the allocation and engineering standards put into effect by the Commission in 1939. In fact, the existing set-up was drafted to meet the changes proposed in the then impending agreement. In preparation for reallocation, the Commission set all outstanding standard broadcast authorizations to expire October 1. This date was subsequently extended to be coincident with the effective date of the Havana pact.

The agreement itself does not specify the changes which must be made in the operating frequencies of broadcast stations in the United States. Nor does it designate the operating assignment of individual stations. However, the assignment of certain classes of stations in Canada, Cuba, and Mexico very nearly controls the assignments in the United States.

It was necessary, as a basis for agreement, to provide six additional clear channels which could be used by Mexico. This is the number provided for Canada. Mexico prior to the agreement had no channels reserved for high-power stations in the broadcast band, whereas Canada already had five such channels. Two clear channels were obtained by taking the United States stations on the present 1010-kilocycle regional channel and the present 1180-kilocycle clear channel and reassigning these stations to different frequencies. Three additional clear channels were provided by shifting the assignments of stations, commencing with the 740-kilocycle channel, upward by one channel. Another channel was provided at 800 kilocycles and still another at 900 kilocycles by 20-kilocycle and 30-kilocycle frequency shifts, respectively. Another clear channel was obtained at 1570 kilocycles in the band 1510 to 1600 kilocycles which had not been completely utilized by the United States.

By these several means it was possible to make available six clear channels at 730, 800, 900, 1050, 1220, and 1570 kilocycles for use by Mexican stations. Canada retained the use of 690 kilocycles and was assigned 740, 860, 990, 1010, and 1580 kilocycles in lieu of the other clear channels now used by Canada. A clear channel at 1540

kilocycles was provided for use by Cuba and the 940-kilocycle clear channel was assigned for joint use by Canada and Mexico.

Under the reassignments all the nations party to the agreement will use the 6 local channels and 41 regional channels, which is a reduction from 42 such channels now provided by the Commission's rules. The number of clear channels increases from 44 to 59. The United States has priority of use with respect to 32 such channels and joint use of 12 with other nations party to the agreement. The use of the 15 remaining clear channels will be under such restrictions as may be set up by the agreement or bilateral arrangements with Canada or Mexico.

Under the reassignments, the United States will retain six local channels. Its number of regional channels will be reduced from 42 to 41. On the other hand, its number of clear channels increases from 44 to 59, and it can use 15 additional clear channels under certain restrictions set out in the pact.

The compact is a mutual arrangement to allocate frequencies for the best public service in the countries involved and typifies the high spirit of cooperation among the participating nations. Under the arrangement, lists of proposed station assignments of these countries are exchanged in advance of the effective date of the agreement. This is done in order that any remaining technical problems may be worked out before actual operations begin.

The North American Regional Broadcasting Agreement was reached at Havana on December 13, 1937. It was ratified by the four countries concerned. Formal filing by the fourth of these (Mexico) on March 29, 1940, confirmed the agreement and makes it operative 1 year from that date. Previously there was no real compact with respect to sharing of frequencies by the principal countries of this continent for the best mutual advantage.

The Commission stresses that the agreement should not, in any sense, be interpreted as creating any vested rights to broadcasters in the new frequencies thus established. That broadcast channels are public domain for use in the public interest, convenience, and necessity is attested by the statutory requirement that licenses are for limited terms and broadcasters are relicensed at stated intervals only upon showing of proper public service.

2. INVESTIGATION OF CHAIN BROADCASTING

As the result of a 2-year investigation of chain broadcasting methods, a special committee of the Commission, on June 12, 1940, made public a 1,300-page report recommending "reformation" of certain practices while retaining the advantages of network service. In connection with its consideration of this report, the Commission received briefs from interested parties and heard oral argument for December 2 and 3, 1940.

The report was submitted by a committee comprising Commissioner Thad H. Brown, chairman, and Commissioners Paul A. Walker and Frederick I. Thompson. Its seven mimeographed volumes were premised on more than 10,000 pages of testimony and nearly 800 exhibits, largely obtained through hearings which continued for 73 days. The inquiry was pursuant to Commission order No. 37 of March 18, 1938.

Subject matter in this committee report relates to the history and development of network broadcasting, policies of the major networks, discussion of major and regional networks, the electrical transcription business, management, or operation of stations by others than the licensees, ownership of broadcast stations, network service and duplication, and the economic effect on stations of network operation.

3. RULES AND REGULATIONS

As stated in the Fifth Annual Report, the Commission on June 23, 1939, adopted new "Rules and Regulations Governing Standard Broadcast Stations" (these rules define a broadcast station operating in the band 550 to 1,600 kilocycles as a standard broadcast station) and the "Standards of Good Engineering Practice" covering standard broadcast stations, effective August 1, 1939.

Few new principles of allocation are involved in the present rules, other than those necessary to make the plan of allocation of broadcast stations within the United States conform to those established by the North American Regional Broadcasting Agreement. Otherwise, only such changes are made as are essential for clarification, and to keep pace with the progress of broadcast.

There are certain other changes to meet problems which have arisen in administering the Communications Act, particularly with respect to the classification of stations in order to bring about a fuller use of the facilities in rendering both urban and rural service. The principal features of present requirements are:

*Classes of standard broadcast channels.*¹—The three classes of channels are clear, regional, and local. Definitions clarify the purpose of each class and, in general, establish the normal protection provided for stations operating on these channels.

Classes of standard broadcast stations.—There are four general classes of stations—Classes I, II, III, and IV.

Class I stations are divided into two groups, both operating on clear channels and designed to render extensive primary service and, at night, secondary service over an extended area and at relatively long distances. Stations of the first group are required to operate with power of 50 kilowatts and no other station will be assigned to the channels occupied except for limited time or daytime operation only. These stations are protected from interference to the primary service areas at all times, and at night to the secondary service areas within the limits of the United States. The second group of class I stations operate on channels on which nighttime operation of class II stations or other class I stations is permitted. Stations in this group are required to operate with not less than 10 kilowatts nor more than 50 kilowatts unlimited time. Class II stations (class II stations subsequently discussed) may be assigned in accordance with the rules and standards. Mutual interference is controlled by the mileage separation and the use of directional antennas.

There are 26 channels on which no nighttime duplication is permitted, that is, the class I stations thereon fall within the first described group, and 18 channels on which class I stations operate with other class I stations or with class II stations operating unlimited time. This permits a maximum usage of clear channels, both for the benefit of the remote rural areas as well as for the general coverage throughout the particular sections in which the stations are located.

A *class II station* is a secondary station operating on a clear channel and designed to render service over a primary service area limited by and subject to such interference as may be received from class I stations. A class II station may

¹The classification of station is purely for administrative convenience of the Commission in acting on applications and does not impart any right of retention of the classification by the licensee, nor furnish a conclusive guide as to the coverage of a particular station.

operate with power not less than 250 watts nor more than 50 kilowatts. A class II station can be required to use directional antenna or other means to avoid interference with class I stations and with other class II stations. Class II stations include daytime and limited stations assigned to clear channels, also unlimited time stations on clear channels on which duplicate nighttime operation is permitted. Although class I stations are not required to protect class II stations, the latter are normally located as not to receive interference during daytime within the 500 uv/m. ground wave contour and during nighttime within the 2,500 uv/m. ground wave contour.

A class III station operates on a regional channel and renders service primarily to a metropolitan district and adjacent rural area. Class III stations are subdivided into two classes:

A class III-A station operates on a regional channel with power of not less than 1 kilowatt nor more than 5 kilowatts. Provision is made for protection of the daytime service area to the 500 uv/m. contour and of the nighttime service area to the 2,500 uv/m. contour.

A class III-B station operates on a regional channel with power of not less than 500 watts nor more than 1 kilowatt night and 5 kilowatts daytime. The daytime service area is protected to the 500 uv/m. contour and of the nighttime service area to the 4,000 uv/m. contour. Regional channels are not allocated exclusively for class III-A or III-B stations. Classification of these stations depends upon conditions surrounding the particular station. However, on a large percentage of the regional channels cooperation of all or part of the stations on a class III channel in the installation of proper directional antennas may so modify the mutual interference as to permit their classification as class III-A stations. Otherwise class III-B classification would be necessary.

A class IV station operates on a local channel and renders service primarily to a city or town and contiguous areas. A station of this class is limited to not less than 100 watts nor more than 250 watts power, and provision is made for the protection to the 500 uv/m. contour daytime and the 4,000 uv/m. contour nighttime. On local channels the separation required for the daytime protection also determines the nighttime separation. Class IV stations may be assigned to regional channels if interference will not be caused to any class III station and the regional channel is fully utilized for class III stations. In such cases class III stations are not required to protect the class IV stations. However, the class IV stations are so located that the interference received is not greater than to the 4,000 uv/m. ground wave contour nighttime and the 500 uv/m. contour daytime.

License period.—Under former rules the license of a standard broadcast station was limited to 6 months. Licensing is now on a 1-year basis. Under the Communications Act the maximum license period which could be authorized is 3 years.

Power of stations.—At the present time the Commission licenses standard broadcast stations to operate with 100 watts to 50 kilowatts (50,000 watts) power. These are the minimum and maximum standards deemed necessary for effective and economic service.

Flexible regulations.—The Rules and Standards of Good Engineering Practice have been made as flexible as possible. It is believed that by this means the fullest use can be made of the broadcast facilities and at the same time provide for future needs as advancements are made in the art.

Applicant requirements.—The rules set forth the showing which applicants for new standard broadcast stations or increased facilities of existing stations must make before the Commission. Previously there has been no guide for such applicants. While the necessary showing varies considerably with individual cases, the general principles set out provide a guide which is valuable to applicants.

Experimental authorizations.—Provision is made for special experimental authorizations in the broadcast band. This encourages experimentation and at the same time maintains the desired control over such authorizations.

Special service authorizations.—Provision is also made for authorizations for special service by existing stations, beyond that provided for in their licenses and not involving experimentation.

Determining station power.—To provide uniformity in determining the operating power of stations employing different types and makes of equipment, every new broadcast station after June 1, 1941, will be required to determine operating power by the direct method; that is, from the resistance and current in the antenna system. Existing stations are permitted to continue determining the

operating power by the indirect method (from the plate input power to the last radio stage) until that date, and for temporary periods thereafter subject to certain conditions.

Start of broadcast day.—The rules formerly specified that the broadcast day began at 6 a. m., local standard time. However, during the winter months this was considerably prior to local sunrise, causing rather severe interference due to nighttime propagation conditions prevailing, while during the summer months, sunrise occurred considerably before 6 a. m. Therefore, by amending the rules to provide for the broadcast day beginning at local sunrise instead of 6 a. m., interference during winter months has been materially reduced and, at the same time, beginning of operation with daytime facilities is provided at an earlier time during the summer months which is desirable particularly in the areas where daylight saving time is employed. The Commission has also permitted daytime and limited time stations to begin operation at 4 a. m., primarily to provide additional service to rural people.

4. STANDARDS OF GOOD ENGINEERING PRACTICE

The present "Standards of Good Engineering Practice" are the result of hearings held in 1938 and 1939 (see last year's report). Provisions represent the majority agreement of broadcasters, broadcast engineers, and broadcast equipment manufacturers.

These standards supplement the rules and regulations by incorporating changes necessitated by recent developments in broadcasting. The rules and regulations cover the basic and more general principles; the standards detail the technicalities and use of facilities.

There are three main divisions of the standards:

1. Substantive reference to principles enunciated in the rules and regulations.
2. Provisions augmenting the rules and regulations by defining policy of allocation and regulation.
3. Detailing of methods to guide applicants and licensees in compiling and submitting data, operation, etc.

Specific subjects dealt with in the standards are:

- Engineering Standards of Allocation.
- Field Intensity Measurements in Allocation.
- Data Required with Applications Involving Directional Antenna Systems.
- Locations of Transmitters of Standard Broadcast Stations.
- Minimum Antenna Heights or Field Intensity Requirements.
- Standard Lamps and Paints.
- Further Requirements for Direct Measurements of Power.
- Power Rating of Vacuum Tubes.
- Requirements for the Approval of the Power Rating of Vacuum Tubes.
- Plate Efficiency of Last Radio Stage.
- Operating Power Tolerance.
- Construction, General Operation and Safety of Life Requirements.
- Indicating Instruments Pursuant to Section 3.58.
- Requirements for Approval of Broadcast Transmitters and Automatic Frequency Control Equipments.
- Requirements for Approval of Frequency Monitors.
- Requirements for Approval of Modulation Monitors.
- Use of Low Temperature Coefficient Crystals by Broadcast Stations.
- Money Required to Construct and Complete Electrical Tests of Stations of Different Classes and Powers.
- Use of Common Antenna by Standard Broadcast Stations or Another Radio Station.
- Use of Frequency and Modulation Monitors at Auxiliary Transmitter.
- Approved Frequency Monitors.
- Approved Modulation Monitors.
- Approved Equipment.
- Standard Broadcast Application Forms.
- Field Offices of the Commission.
- Average Sunrise and Sunset Time.

5. DISTRIBUTION OF BROADCAST FACILITIES

Both the fourth and fifth annual reports gave results of studies made in 1938 of the distribution of broadcast facilities within the United States under the old rules. Application of the new rules has made considerable change in such distribution. However, since these changes are still being made at a rapid rate, a detailed study of the population and areas served has not been considered warranted, particularly in view of the greatly increased work due to the large number of applications with resultant complications. Application of the new rules has materially improved service conditions in general, and further betterment will be obtained when the North American Regional Broadcasting Agreement goes into effect.

NUMBER OF STATIONS

The distribution of standard broadcast facilities throughout the United States on the basis of classification¹ and authorized hours of operation as of June 30, 1940, is shown below.

United States standard broadcast stations in operation or under construction on June 30, 1940

Hours of operation	Class							Total
	I-A	I-B	II	III-A	III-B	III	IV	
Unlimited time.....	24	16	16	156	68	-----	380	660
Limited time.....	-----	-----	27	-----	-----	-----	-----	27
Day time.....	-----	-----	17	-----	-----	25	19	61
Sharing time.....	4	3	5	16	24	-----	17	69
Specified time.....	-----	-----	-----	-----	2	4	23	29
Total.....	28	19	65	172	94	29	439	1 846

¹ Two additional stations, WDAH and WMBQ, are licensed but not operating.

NEW STATIONS

The following table shows the class and hours of operation of the 79 new broadcast stations which were authorized during the fiscal year:

Class of station	Hours of operation	Number
I-A.....	Unlimited.....	-----
-----	Other than unlimited.....	-----
I-B.....	Unlimited.....	-----
-----	Other than unlimited.....	-----
II.....	Unlimited.....	1
-----	Other than unlimited.....	1
III-A.....	Unlimited.....	1
-----	Other than unlimited.....	-----
III-B.....	Unlimited.....	3
-----	Other than unlimited.....	-----
III.....	Daytime.....	3
IV.....	Unlimited.....	62
-----	Other than unlimited.....	8
Total.....	-----	79

¹ These classifications are made as accurately as possible under present operating or authorized conditions. However, when assignments under the new rules and the North American Regional Broadcasting Agreement have been completed, the classification of a number of individual stations may be materially different.

DIRECTIONAL ANTENNAS

The following table shows the number of directional antenna systems in use or authorized at the close of each fiscal year from 1932 to 1939. As pointed out in previous reports, this type of antenna has proven very useful in reducing interference and directing the signals to desired areas, thus improving service. The new rules and standards contemplate still more extended use of this type of antenna on regional and clear-channel frequencies. It is not considered feasible from an economic or allocation standpoint to use directional antennas in connection with local channel stations (class IV stations under the new classification). In addition to the new directional antennas indicated by the table, a number of those already installed have been readjusted, redesigned, or rebuilt in order to improve station operation or to provide for changes in conditions affecting their operation.

Number of directional antennas in use or authorized for use, fiscal year ended June 30, 1940

	1932	1933	1934	1935	1936	1937	1938	1939	1940
Stations on clear channels.....	0	2	4	7	8	9	11	14	22
Stations on regional channels.....	2	4	11	20	25	39	53	68	97
Total.....	2	6	15	27	33	48	64	82	119

Attention is invited to the chart in the appendices showing increase in number of broadcast stations since 1927. It will be noted that the discrepancy between the total number of stations and simultaneous operations at night is becoming less due to the increased usage of directional antennas and the application of the new rules and standards. It is hoped that further reduction in this difference can be made. Where nighttime operation is not permitted, the service which a station can render is materially curtailed. And when events of special interest arise special request must be made therefor. This is not only an inconvenience to the licensee but materially adds to the duties of the Commission, besides causing interference to and reduction of service by other stations.

6. FOREIGN LANGUAGE BROADCAST

There are approximately 200 broadcast stations in this country which, at times, carry programs in 30 different languages for the benefit of the foreign-born populations in areas in which these stations are located. In order to secure more detailed information concerning the extent and character of such service, the part these broadcasts play in the lives of the foreign-language groups, and the comparative value of foreign-language broadcasts to advertisers and others interested in reaching such groups, the Commission, on October 8, 1940, addressed a questionnaire to the stations concerned.

On October 23, 1940, the Commission adopted a new rule requiring international broadcast stations to make verbatim mechanical records of all international programs transmitted, and to keep such records for a period of 2 years, furnishing the Commission with scripts, translations, and other record upon request.

7. HEARINGS

EXPEDITING GRANTS

The number of hearings held in connection with broadcast matters was substantially less than during the previous fiscal year. This is attributed in large part to changes in the Commission's method of handling applications. In the past it had been the practice to designate for hearing, without seeking additional information from the applicants, applications which upon their face did not contain sufficient information to warrant the Commission in finding that grants would meet the statutory standard. During the past year particular effort was made to obtain in considerable detail additional facts which might enable the Commission to have before it information as full and complete as could be obtained through a formal hearing. New application forms were adopted with a view to eliciting, so far as possible, all pertinent information in the first instance, thus eliminating the necessity of requiring applicants to file additional material.

Not only has the Commission been able to grant applications which in no way conflict with others, but it has been possible in the case of conflicting applications, where interference precludes the granting of all pending requests, to select the proposal which will result in the greatest benefit to the public and designate the others for hearing. Ample protection is afforded through petitions for reconsideration, petitions for rehearing, hearings, and the right of appeal to the courts provided by the statute. Should the Commission find, after hearing, that a conflicting application should be granted, it has full authority to make such grant effective, even though it involves modification of previously granted authorizations, or even deletion of previously licensed stations. The principal beneficial result of eliminating unnecessary hearings has been to provide broadcast service where needed without long delays.

In a substantial number of cases, applicants whose applications have been designated for hearing petition the Commission for reconsideration, either pointing out facts believed to have been overlooked or furnishing additional data. Such petitions are given full consideration by the Commission, and if the need therefor is shown, the original application will be set aside and other application granted. In some instances where a hearing has been ordered, amendments may be made, thereby eliminating the factor which necessitated designation for hearing.

CONDUCT OF HEARINGS

Even though a majority of the hearings in broadcast matters were conducted by members of the legal staff of the Commission specifically designated in each instance for the purpose, a substantial amount of time was devoted to hearings by the Commission, committees of commissioners, and individual commissioners. In addition to holding hearings for the purpose of establishing new rules governing television stations, the Commission as a whole conducted the hearing upon the order issued against the licensee of WMCA, New York City, to show cause why its license to operate that station should not be revoked because of alleged interception and broadcasting of secret

radio communications sent by the Governments of Germany and Great Britain containing orders to naval vessels of those Governments, in violation of the provisions of section 605 of the Communications Act. Opinion and order of the Commission was entered on October 25, 1939.

Hearings for the purpose of establishing rules and regulations, as well as engineering standards, for the new FM [frequency modulation] service were conducted by a committee of commissioners, and hearings upon revocation orders against nine stations were conducted by individual Commissioner.

The Commission attorney designated to preside at a hearing has the responsibility of ruling upon the admissibility of evidence, of producing testimony on behalf of the Commission, which is generally confined to that of members of the Commission's engineering staff, and, in general, of compiling a record which will contain a full and complete basis for findings upon the pertinent issues. In exceptional instances only, a member of the legal staff is assigned to participate in a hearing as counsel for the Commission.

After hearing, proposed findings of facts and conclusions, and briefs, if desired, are submitted by the parties concerned. Thereafter the Commission publishes its own tentative findings and conclusions, which are subject to exceptions, briefs, and oral argument. If, upon consideration of the exceptions, briefs, and oral argument, corrections or modifications of the Commission's proposed findings and conclusions are necessary, a final decision, containing statements of facts and grounds for decision, is prepared and issued; otherwise an order, adopting as final the proposed findings and conclusions is entered. A party who is dissatisfied with the decision is provided by the statute with a right to petition for rehearing.

PETITIONS FOR REHEARING

The burden of the Commission in disposing of petitions for rehearing continued to be heavy. This was due in part to interpretations placed on a decision of the Court of Appeals for the District of Columbia in the *Red River Broadcasting Company* case (see Fourth Annual Report) that in order to exhaust administrative remedies, petitions for rehearing must be filed and disposed of before the Commission prior to taking an appeal. The volume of such petitions was also enlarged by the adoption by the Commission of a policy of granting applications without hearing. Reconsideration of Commission action where grants are made without hearing is sought by means of petitions for rehearing under the present rules of practice.

During the year 56 petitions for rehearing in radio broadcast cases were filed, 41 of which were denied, 6 granted, and 9 dismissed. Also, there were 5 petitions for rehearing filed in common carrier cases; 4 of these were denied and 1 granted. In a large number of these cases the Commission published, together with its orders, formal decisions setting forth the reasons for the action taken. A list of the petitions filed and disposed of is contained elsewhere.

8. COMPLAINTS AND INVESTIGATIONS

"NO CENSORSHIP"

The Commission receives thousands of letters annually complaining about matters incident to program broadcasts. The Communi-

cations Act states that "nothing in this act shall be understood or construed to give the Commission the power of censorship over the radio communications or signals transmitted by any radio station." As the greater part of the complaint mail concerns individual radio performers, the Commission consequently has responded that it does not order particular programs or individuals either on or off the air.

Complaints about particular radio programs run the gamut from taking issue with an announcer's English and differing with the speaker's conclusions, to objections to advertising and protesting refusal of time on the air. In many of these cases the Commission is, in effect, asked to exercise the power of censorship. In such instances the complainant is advised that the Commission is without jurisdiction to act. In some cases the Commission refers complaints to the particular station or network involved, or to the Code Compliance Committee of the National Association of Broadcasters referred to hereafter.

With respect to advertising continuities, the Commission entertains complaints where the action of the station appears to have been against the public interest, and also occasionally refers complaints alleging unfair trade practices to the Federal Trade Commission.

In the matter of refusal of time on the air, complainants are informed that broadcast stations are expressly declared by the Communications Act not to be common carriers. Accordingly, determination as to who shall appear on programs is a matter resting in the first instance with the individual broadcast station which may refuse or permit the use of its facilities to particular persons as it sees fit. By the same token the station may give free time or charge for time or make charges at varying rates. But broadcast stations have the duty of serving public interest, convenience, and necessity. The discretion left to the broadcasters in the selection of who may use the facilities and the conditions with respect to such use is subject to this legal requirement. In carrying out the obligation to render a public service, stations are required to furnish well-rounded rather than one-sided discussions of public questions. The duty of serving the public interest does not, however, imply any requirement that the use of broadcast facilities shall be afforded to the particular individual or group, in view of the principals enumerated above. The Commission has the duty of determining whether the past conduct of stations has been consistent with their obligations under the law.

Some program inquiries have to do with the right of free speech. The Communications Act provides that "no regulation or condition shall be promulgated or fixed by the Commission which shall interfere with the right of free speech by means of radio communication." This, of course, does not imply that all who may wish to do so must be given the right to speak on the air. The number of hours available in the day over the limited number of broadcast stations makes this impossible. The Commission, of course, has made no regulation or condition interfering with the right of free speech.

PROHIBITED BROADCASTS

Certain broadcasts are definitely barred from the radio by the Communications Act. Hence, cases which involve violation of the specific injunction against programs containing lottery information,

or containing obscene, indecent or profane language are investigated by the Commission and referred to the prosecuting authorities for appropriate action.

RADIO FACILITIES FOR CANDIDATES FOR PUBLIC OFFICE

Because of the widespread interest in politics during the year, the Commission received a considerable number of complaints coming under the provision of the Communications Act requiring that if a licensee permits any person who is a legally qualified candidate for any public office to use a broadcasting station, he shall afford equal opportunities to all other such candidates for that office. The Commission was called on to make a number of rulings under this section of the law. Inquirers were informed that the section does not require stations to permit broadcasts by any candidate unless the station has previously voluntarily permitted a broadcast by another candidate for the same office. The provision does not apply to persons other than the legally qualified candidates themselves and has no reference to persons speaking on behalf of candidates. The provision applies only to broadcasts by candidates speaking in furtherance of their candidacy, and the mere fact that a station has permitted a person who is a candidate to use its facilities to speak on a nonpolitical subject does not result in a requirement that equivalent time shall be given other candidates for the office.

The Commission also received a number of requests for rulings on behalf of minority political parties as to the effect of the exclusion of candidates of the particular party from the general election ballot in the State in which the station was located. The Commission ruled that the words "legally qualified candidate" are not to be construed to be limited to persons whose names appear on the general election ballot. This is for the reason that if the particular person possesses the statutory and constitutional qualifications to hold an office, his name may be written into the ballot by the voters or supplied by "sticker" and a valid election may result.

The Commission recognized that the mere fact that any name may be written in does not entitle all persons who may publicly announce themselves as candidates to demand the use of broadcast facilities, for all citizens possessing the requirements are potential candidates and the limited broadcast facilities will not accommodate all who might desire to speak.

The Commission also recognized that broadcasters may make suitable and reasonable requirements with respect to proof of candidacy of an applicant for the use of facilities. A showing that the candidate's name is included on the election ballot should be accepted as such proof. In the absence of a showing that the candidate's name will appear on the general election ballot, other factors may properly be taken into account in determining whether a person is a "legally qualified candidate." Among them are: (1) A showing that the candidate has been duly nominated by a political party; (2) a showing that the party has a substantial membership composed of persons entitled to vote; or that, historically and currently, it has been and is recognized as a political party in the United States; (3) a showing by certificate of a substantial number of eligible voters in the com-

munity or by other means that the applicant is, in fact, a bona fide candidate for office.

BROADCAST "CODE"

The National Association of Broadcasters has adopted a code of ethics setting forth certain standards of conduct which that organization believes are conducive to the best interests of broadcasting. The code represents an effort by broadcasters at self-regulation and its provisions should not be confused with rules and regulations of the Commission. Acceptance of the provisions of the code by stations does not relieve the latter of their duties and responsibilities under the law.

PUBLIC SERVICE CONSIDERATION

The Commission can and does review the general public service rendered by stations in determining if renewal of license is in the public interest. The statute requires the Commission in acting upon renewals to consider the same factors as it must consider before granting a new application. In either case the service rendered to the public is the dominant consideration.

INVESTIGATIONS

Of the investigations pending against 42 broadcast stations at the close of the preceding fiscal year, 22 were closed without hearing and 5 after hearing. Three stations were deleted after hearing, 2 of which involved orders of revocation. Of these investigations, 12 are still uncompleted, 11 of which are pending on the hearing docket. They involve the following types of complaint:

Violations of section 310 (b)-----	7
Program matters-----	3
Engineering violations-----	2

During the fiscal year investigations made involved 106 broadcast stations. Of this number, 70 were adjusted without hearing and 3 after hearing. Construction permit for 1 station was cancelled. Investigations are now pending against 33 stations of which 16 are in hearing, 7 involving revocation orders. The investigations instituted involve the following types of complaint (more than one complaint may have been filed against a station in a particular case):

Ownership and control-----	21
Lottery programs-----	21
Failure to receive prizes or merchandise offered-----	15
Allegedly false or misleading statements-----	13
Alleged violations of provisions of the act (sec. 605, 1; sec. 315, 2; sec. 317, 3)-----	6
Medical programs-----	5
Miscellaneous program matters-----	5
Foreign language programs and alleged propaganda-----	6
Engineering violations-----	3
Generally inferior program service-----	3
Allegedly false statements in applications-----	3
Horse-race information-----	2
News programs-----	2
Financial qualifications-----	2
Labor programs-----	1
Interference with Coast Guard communications-----	1
Obscene language-----	1
Fortune telling programs-----	1
Miscellaneous complaint not involving program matter-----	1

9. REVOCATIONS

During the fiscal year nine standard broadcast stations figured in hearings upon revocation orders. Seven of the revocation orders involved stations located in Texas and were based upon alleged misrepresentation to the Commission at the time original authorizations were secured as to the real parties in interest and upon transfers of control of the stations without the consent of the Commission being first obtained as required by statute. Final decisions upon these orders had not been entered at the close of the fiscal year.

One of the remaining revocation hearings arose out of false testimony of the licensee at the original hearing concerning his financial standing as well as an unauthorized assignment of license or transfer of control, while the other involved solely an illegal transfer of control of the station. Final orders, revoking the licenses, have been entered in the two last-mentioned cases.

10. LITIGATION

GENERAL REVIEW

During the fiscal year the conduct of litigation in the courts has been one of the most important of the Commission's activities. Of particular significance are the United States Supreme Court decisions, hereinafter discussed, defining the jurisdiction of the United States Court of Appeals for the District of Columbia and the powers and the duties of this Commission. These decisions are pertinent to the general field of administrative law.

At the beginning of the fiscal year there were pending 16 cases¹ to which the Commission was a party, all of which were in the United States Court of Appeals for the District of Columbia. During the fiscal year, 15 additional appeals were taken to the Court of Appeals for the District of Columbia from decisions of the Commission, making a total of 31 cases pending in that court during the entire fiscal year; 1 injunction suit against the Commission was instituted in the United States District Court for the District of Columbia, and 7 petitions for writs of certiorari were filed in the Supreme Court.

Of the 31 cases in the Court of Appeals for the District of Columbia, one resulted in an affirmance of the Commission's decision, 19 were dismissed,² and 11 were still pending at the end of the fiscal year.³ The suit for injunction in the United States District Court for the District of Columbia was ordered dismissed by the court upon the Commission's motion.

Of the seven petitions for certiorari filed in the Supreme Court, five were filed by the Commission and two by other parties. The latter two were denied and the five filed by the Commission were granted. Decisions upholding the action of the Commission were rendered by the Supreme Court in three of these five cases; the other two were still pending.⁴

¹ One of these cases was a suit for writs of prohibition and mandamus against the Commission.

² Including the suit for writs of prohibition and mandamus.

³ Included in the eleven pending cases are two cases in the Supreme Court at the close of the fiscal year which involve interlocutory matters. Since these two cases had not yet been decided on the merits by the Court of Appeals at that time, they are also listed as cases pending in that court. By November 26, 1940, three of the 11 pending cases had been dismissed by the Court of Appeals.

⁴ Both cases were decided in the Commission's favor on November 25, 1940. See p. 61, footnote 1.

RECORD OF COURT CASES

The following tabulation shows the status of all cases for the fiscal year:

Nature of the case	Number	Final decision for Commission	Final decision against Commission	Pending at end of fiscal year
Cases in the Court of Appeals.....	31	20	0	11
Original suits in District Court.....	1	1	0	-----
In Supreme Court on writ of certiorari.....	15	3	0	12

¹ See footnote 3, p. 58.

² This figure does not include the two cases in which petitions for certiorari from decisions by the Court of Appeals favorable to the Commission were denied.

³ See footnote 1, p. 61.

A list of the cases in litigation, and a detailed statement of the facts and principles of law involved in those cases in which decisions were rendered during the past year will be found in the statistical section of this report.

Because of the general importance, mention should be made here of the cases decided by the United States Supreme Court during the past year, and of the cases now pending in that court.

Federal Communications Commission v. Sanders Brothers Radio Station, 309 U. S. 470.—Sanders Brothers, a licensee of an existing radio station, appealed to the Court of Appeals for the District of Columbia from a decision of the Commission granting the application of Telegraph Herald Co. for a new radio station in the same community. The basis of the appeal was that the Commission's action was erroneous in that the Commission had failed to consider the adverse economic effect which the proposed competition of Telegraph Herald would have upon Sanders Brothers' station. The Court of Appeals reversed the Commission's decision and held that the Commission erred in not making findings concerning the adverse economic effects which would result to the existing station from the competition of the proposed new station. The Supreme Court reversed the judgment of the Court of Appeals and affirmed the Commission holding that economic injury to an existing station is not a separate and independent element to be considered by the Commission, or as to which the Commission must make findings, in determining whether it should grant or deny a license. The court stated that the Communications Act does not essay to regulate the business of licensees and was not intended to protect licensees against competition but was designed to preserve competition in broadcasting. This decision sustained the contention of the Commission that the economic effect on an existing station is not an element which the Commission must consider in passing upon an application for a new station. The Commission also contended that Sanders Brothers did not have standing to maintain the appeal, but the Supreme Court rejected this contention.

Federal Communications Commission v. Pottsville Broadcasting Company, 309 U. S. 134; *Fly v. Heitmeyer*, 309 U. S. 146.—Both of these cases involved suits for writs of prohibition and mandamus against the Commission. In the *Pottsville* case the Commission denied the appellant's application for a construction permit. Upon appeal from this denial, the Court of Appeals reversed the Commis-

sion's decision upon the ground that it had been based upon an erroneous interpretation of Pennsylvania law [98 F. (2d) 288]. During the pendency of the appeal two new applications for the same facilities had been filed with the Commission. Upon reversal and remand of the case by the Court of Appeals, the Commission designated the *Pottsville* application and these two new applications for argument upon the question of the comparative merits of the three applicants. Pottsville thereupon petitioned the Court of Appeals for writs of prohibition and mandamus directing the Commission to set aside its order designating the application for argument on a comparative basis and to hear and consider that application on the basis of the record originally made and in accordance with the mandate of that court. The Court of Appeals issued the writs as requested. On certiorari the Supreme Court reversed the judgment of the lower court, and held that the Court of Appeals erred in issuing these writs. In its decision, the Supreme Court pointed out that the sole function of the Court of Appeals on appeal from Commission decisions is to correct any errors of law in such decisions. However, the Court further declared:

But an administrative determination in which is imbedded a legal question open to judicial review does not impliedly foreclose the administrative agency, after its error has been corrected, from enforcing the legislative policy committed to its charge. * * *

The Commission's responsibility at all times is to measure applications by the standard of "public convenience, interest, or necessity." The Commission originally found respondent's application inconsistent with the public interest because of an erroneous view regarding the law of Pennsylvania. The Court of Appeals laid bare that error, and in compelling obedience to its correction, exhausted the only power which Congress gave it. At this point the Commission was again charged with the duty of judging the application in the light of "public convenience, interest, or necessity." The fact that in its first disposition the Commission had committed a legal error did not create rights or priority in the respondent, as against the later applicants, which it would not have otherwise possessed. Only Congress could confer such a priority. It has not done so. The Court of Appeals cannot write the principle of priority into the statute as an indirect result of its power to scrutinize legal errors in the first of an allowable series of administrative actions. Such an implication from the curtailed review allowed by the Communications Act is at war with the basic policy underlying the statute. It would mean that for practical purposes the contingencies of judicial review and of litigation, rather than the public interest, would be decisive factors in determining which of several pending applications was to be granted.

In the *Heitmeyer* case substantially identical facts and the same principle of law were involved. The Supreme Court, citing its decision in the *Pottsville* case, reversed the judgment of the Court of Appeals and rendered judgment for the Commission.

Associated Broadcasters, Inc., v. Federal Communications Commission, No. 7282, and *Columbia Broadcasting System of California, Inc., v. Federal Communications Commission*, No. 7283, in United States Court of Appeals for the District of Columbia, decided November 29, 1939: These cases involve two appeals to the Court of Appeals from an order of the Commission refusing after a hearing to give its consent to an assignment of a license. In the *Associated* case the appellant is the proposed transferor, and in the *Columbia* case the appellant is the proposed transferee. The Court denied the Commission's motions to dismiss these appeals, holding that a proposed assignee of a license who requests Commission consent for the assignment of a

license may appeal to the Court of Appeals from a decision of the Commission refusing to give such consent because such person is in reality an "applicant for a station license" within the meaning of the appeals section of the Communications Act of 1934. By the same reasoning, the Court held that the proposed transferor is a person "aggrieved or whose interests are adversely affected," within the meaning of the appeals section, by the Commission's decision refusing such consent. In an earlier decision (*Pote v. Federal Radio Commission*, 62 App., D. C., 303, 67 F. (2d) 509, cert. den., 290 U. S. 180) the court had held that a proposed assignee was not included within the words "applicant for station license" in the appeals section of the Radio Act of 1927. The Commission had contended that this construction had presumptively been approved by Congress because the provision governing the jurisdiction of the Court had been re-enacted without any substantial change after the decision in the *Pote* case, but the Court of Appeals rejected this contention. The Supreme Court has granted certiorari in both these cases.¹

11. ACCOUNTING DATA

Reports dealing with financial or accounting matters have been prepared and considered by the Commission in connection with a large number of applications for construction permits, transfers of control, and assignments of licenses.

Annual financial report.—A new and simplified form of an annual financial report was instituted and made available for use by all standard broadcast stations and networks in reporting to the Commission for the calendar year 1939. Simplification of the form was accomplished in collaboration with representatives of the broadcast industry. The purpose of this report is to collect financial and statistical data from the industry on an annual basis. In addition to their use in serving the needs of the Commission, the reports are analyzed and compilations of financial and other data for the information of the industry and the general public have been released.

Report on chain broadcasting.—The data introduced in evidence in the hearing held on chain broadcasting (docket 5060) pursuant to Commission Order No. 37 were digested, and analyses from such evidence are now compiled in a report entitled "Digest and Analysis of Evidence Presented in the Hearing on Commission Order No. 37 and of the Files of the Commission."

Field investigations.—Field investigations dealing with matters of finance involved in broadcast applications (also some operating stations) have been undertaken in several instances. As a result of hearings in which there was presented the evidence obtained in these investigations, one station has been deleted, proposed order of revocation has been ordered in each of five others, and proposed findings are pending in each of three more stations.

Financial and operating data.—The accompanying compilation gives the salient items of financial and operating data with respect to the major networks and the 705 standard broadcast stations reporting for the calendar year 1939. Supplemental figures will be found in the statistical yearbook issued simultaneously with this report.

¹ On November 25, 1940, the Supreme Court, in an opinion by Mr. Justice Frankfurter, reversed the order of the Court of Appeals in denying the Commission's motion to dismiss each appeal.

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*Operating and financial data concerning 3 major networks and licenses of 705
broadcast stations*

[For the calendar year 1939]

Total time sales by networks and stations-----	\$129,968,026
Deduct: Commission to agencies, representatives and brokers--	17,405,414
Revenue from sale of time-----	112,562,612
Miscellaneous revenues-----	11,319,252
Total broadcast revenues-----	123,881,864
Broadcast expenses (including taxes, depreciation, compensation, etc.)-----	100,043,920
Broadcast service income-----	23,837,944
Number of employees (December 31)-----	24,605
Total compensation-----	51,620,305
Investment (at cost) in tangible broadcast property ¹ -----	64,424,626
Less: Accumulated depreciation to date-----	28,878,981
Net amount of broadcast assets-----	35,545,645

¹Five station licensees reported no owned plant. Broadcast property owned by Mutual Broadcasting System, Inc., reported at a nominal value of \$1.

CHAPTER VI

Nonstandard Broadcast

1. GENERAL DEVELOPMENTS
2. REALLOCATION OF HIGH-FREQUENCY BANDS
3. FREQUENCY MODULATION
4. CALL LETTERS
5. NONCOMMERCIAL EDUCATIONAL BROADCAST SERVICE
6. TELEVISION BROADCAST SERVICE
7. INTERNATIONAL BROADCAST SERVICE
8. RELAY BROADCAST SERVICE
9. FACSIMILE BROADCAST SERVICE
10. DEVELOPMENTAL BROADCAST SERVICE

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CHAPTER VI—NONSTANDARD BROADCAST

1. GENERAL DEVELOPMENTS

There have been substantial developments in the nonstandard broadcast services, which include high frequency, noncommercial educational, television, international, relay developmental, and facsimile broadcast. Of major interest has been the evolution of high-frequency broadcast service from the experimental stage to a regular service.

Rules and regulations, as well as Standards of Good Engineering Practice, were adopted by the Commission on June 22, 1940, providing for the regular licensing of these stations in the band of frequencies from 43000 to 50000 kilocycles, using frequency modulation [FM] on a commercial basis similar to that of standard broadcast stations.

2. REALLOCATION OF HIGH-FREQUENCY BANDS

Under past experimental authorization, high-frequency broadcast stations, together with facsimile stations, were licensed in the band between 42000 to 44000 kilocycles. The Commission, finding that high-frequency broadcasting using frequency modulation had developed to a stage where a regular service could safely be inaugurated, was confronted with the problem of finding sufficient space in the radio spectrum to accommodate this new service. Sufficient channels were necessary in order to provide for a large number of stations throughout the nation on a competitive basis.

In consideration of the needs of high-frequency broadcasting and also the needs of television, the Commission found that 40 channels should be allocated to the broadcasting service between 40000 and 50000 kilocycles while continuing 7 television channels 6000 kilocycles wide below 108000 kilocycles, the present practical limit for television broadcasting.

This was accomplished by reallocating the band 44000 to 50000 kilocycles previously allotted to television to the high frequency broadcast service. The band of frequencies from 42000 to 50000 kilocycles was made available for aural broadcasting. The same number of television channels below 108000 kilocycles was maintained by assigning the band 60000 to 66000 kilocycles to television in place of 44000 to 50000 kilocycles.

The band 60000 to 66000 kilocycles was previously assigned to Government stations. The Commission in turn released 41000 to 42000 kilocycles and 132000 to 140000 kilocycles to Government use. This equitable exchange of frequencies between the Commission and the Government departments, accomplished through the medium of the Interdepartment Radio Advisory Committee, has resulted in satisfactory solutions for frequencies for all stations concerned. The services previously operating between 132000 to 140000 kilocycles

were assigned frequencies between 156000 to 162000 kilocycles, which was used by adjunct television stations and 116000 to 119000 kilocycles which was assigned to broadcasting.

In the band 42000 to 50000 kilocycles, five 200-kilocycle channels comprising 42000 to 43000 kilocycles have been allocated to noncommercial educational broadcast stations while 43000 to 50000 kilocycles (35 200-kilocycle channels) were set aside for commercial high-frequency stations.

3. FREQUENCY MODULATION

HEARING AND REPORT

The Commission has licensed experimental stations on frequencies above 25000 kilocycles over a number of years for the development of such frequencies to render a regular broadcast service. When the frequency modulation [FM] hearing started on March 18, 1940, 31 such experimental stations were authorized to use amplitude modulation and 22 stations for frequency modulation. A total of 173 applications were filed for new frequency modulation stations before and subsequent to the hearing.

As a result of the evidence adduced at two weeks of hearing, and investigations conducted by its staff, the Commission concluded that frequency modulation had advanced to a stage where the establishment of a commercial service was desirable in the public interest.

In the Commission's Report on Frequency Modulation dated May 20, 1940, the Commission stated:

Frequency modulation is highly developed. It is ready to move forward on a broad scale and on a full commercial basis. On this point there is complete agreement amongst the engineers of both the manufacturing and the broadcasting industries. A substantial demand for FM (frequency modulation) transmitting stations for full operation exists today. A comparable public demand for receiving sets is predicted. It can be expected, therefore, that this advancement in the broadcast art will create employment for thousands of persons in the manufacturing, installation, and maintenance of transmitting and receiving equipment and the programming of such stations.

HOW "FM" OPERATES

In brief, the basic difference between amplitude [used by standard broadcast] and frequency modulation is as follows: Modulation is a process of imparting sound or other signals (intelligence) to the transmitted radio wave. Radio waves have two defining characteristics—amplitude (intensity) and frequency. With amplitude modulation the sound controls the amplitude of the radio wave transmitted, while the frequency remains constant. Conversely, frequency modulation varies the frequency of the radio wave in accordance with the sound, while the amplitude remains constant. The principle of frequency modulation has long been known but its advantages for a wide range system were not developed until recently.

Frequency modulation has advantages over amplitude modulation. Foremost is the reduction of noise present in the received signal. Man-made, electrical, and atmospheric radio noises consist primarily of amplitude variations. Frequency modulation signals have an inherent advantage in discriminating against noise since the amplitude is maintained constant throughout the frequency modulation system. Secondly, experimental operations have developed the fact that a

greater signal from another station in the same channel could be tolerated than with amplitude modulation, making for a closer possible geographical separation of stations. Frequency modulation has the characteristic of excluding all except the strongest signal.

The fact that stations may be operated at relatively close geographical separations on the same channel counters the disadvantage that frequency modulation signals occupy a greater place in the spectrum than do amplitude modulation signals. (An amplitude modulation channel occupies 40 kilocycles while a wide band frequency modulation channel occupies 200 kilocycles.)

WIDE BAND USE

The high frequency broadcast service has been developed on frequencies above 30000 kilocycles because of the wide band required (200 kilocycles) and because the signals received must be confined principally to the ground wave for satisfactory results. Sufficient space is available in this region for the wide bands of frequencies required for frequency modulation signals. The coverage of high frequency broadcast stations in the band 42000 to 50000 kilocycles is substantially the same at night as it is during the day. However, such stations have not exhibited long distance coverage properties as obtained, particularly at night, with present high-power clear-channel standard broadcast stations.

"FM" COVERAGE

A high frequency broadcast station using frequency modulation with the highest present day practical power (50 kilowatts) and antenna of reasonable height (1,000 feet or so) has a primary service area approximately 100 miles in radius over reasonably level ground. Accordingly, amplitude modulation in the standard broadcast band may be required indefinitely for the purpose of giving widespread rural coverage.

For the coverage of centers of population and trade areas, this new class of station offers a distinct improvement. Since its useful signal is propagated along the ground, the coverage obtainable with high frequency broadcast stations is dependent upon two factors: the effective radiated power and the height of the antenna above the service area. The operating power alone is not an indication of the coverage of the station. Doubling the height of the antenna increases service area equivalent to increasing the transmitting power four times. All of the frequencies in the band 42000 to 50000 kilocycles have substantially the same characteristics as regards coverage, while the standard broadcast band stations of equal power operating at the extremities of the band have widely different service areas.

HIGH FREQUENCY RULES AND STANDARDS

The Commission on June 22, 1940, promulgated its rules governing high-frequency broadcast stations. These stations are to be governed by the applicable sections of the "Rules Governing Standard Broadcast Stations." Three groups of frequencies have been set aside for stations on the basis of coverage to be given.

Unlike standard broadcast stations, frequency modulation stations are licensed to serve "basic" and "limited" trade areas, with particular consideration for rural service where possible.

Under Commission rules and regulations governing this new high frequency broadcast service, FM stations are available to every community. Not subject to the same interference as standard broadcast stations, they can operate on the same channel with less mileage separation. However, FM stations serving the same area are not assigned adjacent channels. Consequently, a number of FM stations using alternate channels may operate in the same area without interfering with one another.

FM stations are authorized to serve specified areas in square miles. Service in places where more than one station may be located is comparable except for variables due to antenna height and other engineering considerations.

Twenty-two channels are open to stations serving basic and limited trade areas with populations of more than 25,000 each. Six channels are allocated for service areas with less than that population, and 7 channels are reserved for stations intended to each primarily serve a rural area at least 15,000 square miles in extent.

To obviate possible monopoly, and to encourage local initiative, no person or group is permitted to control more than one FM station in the same area, and not more than six in the Nation as a whole. At the outset, the Commission is requiring a daily (except Sunday) minimum operating schedule for FM stations of at least 3 hours during the day and 3 hours at night. To demonstrate the capabilities of the new service, an hour a day minimum must be devoted to programs not duplicated simultaneously in the same area, which means programs distinct from standard broadcast. Otherwise, FM operation is governed largely by the standard broadcast rules.

FM and standard broadcast will not mutually interfere because, as previously explained, these two types of service are on widely separated bands. Because of their different positions in the spectrum, FM cannot be received on standard broadcast receivers and, likewise, standard broadcast cannot be received on FM sets. Also, the two services require different transmitting equipment.

The Commission has also promulgated "Standards of Good Engineering Practice" wherein a procedure is set forth for determining the coverage expected from a proposed station. Account must necessarily be taken of the topography of the service area. Since stations are licensed on the basis of their coverage, provision has been made in the standards for subsequent measurement of the actual coverage and adjustments to enable the station to establish that it in fact actually serves the area for which it is licensed. It is difficult to accurately predict the service area of a proposed FM station because of the large number of variables encountered.

4. CALL LETTERS

Under international agreement, the first letter (in some cases the first two letters) of a call signal indicates the nationality of a radio station. The United States is assigned the use of three letters—N, K, and W. Hence the present domestic assignment of combinations beginning with these letters.

Call letters beginning with N are reserved for the exclusive use of the Navy and Coast Guard.

Call letters beginning with **K** are assigned to broadcast stations located west of the Mississippi River, and in the Territories.

Call letters beginning with **W** are assigned to stations east of the Mississippi River.

Any existing call letters not in accordance with this procedure is due to the fact that the station was licensed before the allocation plan was adopted.

Though limited to the use of **K** or **W** as the initial letter, the Commission has provided distinctive calls for **FM** broadcast stations by adopting a new system of call letters with interposed numbers. Following the initial letter two numbers are utilized to indicate the frequency assignment. This is possible because all **FM** stations are on the odd hundreds of kilocycles in the 42000–50000 kilocycles band. Thus, the first figure and the last two figures of the frequency assignment can be dropped. In addition, and where possible, the city or area will be indicated by the second letter or combination of a second and third letter—as “**B**” for Boston, “**NY**” for New York City, etc. For example: **W41B** would indicate that the station is located in Boston and operates on 44100 kilocycles. The letter “**E**,” however, is reserved for noncommercial educational broadcast stations.

This arrangement will not disturb the approximately 15,000 remaining 4-letter call combinations which are being assigned to the older services at the rate of between 40 and 50 a week. This means a supply of such combinations for about 6 years only. It should also be noted that under international treaty, ship stations have priority in the assignment of 4-letter calls.

5. NONCOMMERCIAL EDUCATIONAL BROADCAST SERVICE

Licenses for noncommercial educational broadcast stations are issued to organized nonprofit educational agencies upon showing that the station will be used to advance the agency's educational program, particularly pertaining to its use in a system comprising several units. In addition, educational and entertainment programs may be directed to the public. Sponsored or commercial programs or announcements are not permitted.

The Commission's Order No. 67 provided for the reallocation of the frequency band assigned to noncommercial educational broadcast stations, the only change being that the band for such stations has been placed 1000 kilocycles higher in the spectrum. This arrangement provides for five 200-kilocycle channels adjacent to the high frequency broadcast band. These stations are to use frequency modulation unless a showing of need for amplitude modulation is made. The 1000 kilocycles set aside in the lower part of the band allocated to commercial broadcast stations not only places the educational stations on an entirely independent basis but also gives them the benefits of the developments in the service rendered by commercial stations.

At the end of the fiscal year two noncommercial educational broadcast stations were in operation and one construction permit was outstanding for a new station in Beattyville, Ky., to be operated by the University of Kentucky. The station proposes to furnish an educational program service to 50 or 60 mountain schools, as well as to

adjacent communities. In August 1940, the Board of Education of San Francisco was granted authority to use frequency modulation in educational broadcasts by the San Francisco Unified School District. The following month the Cleveland City Board of Education was authorized to change its system from amplitude modulation to FM.

With the increased interest in high-frequency broadcasting and the establishment of a commercial service in this band, the number of receivers that will receive the educational stations will increase substantially. It is expected that there will be an increase in the number of noncommercial educational broadcast stations during the coming fiscal year.

FEDERAL RADIO EDUCATION COMMITTEE

In December 1939, the Federal Radio Education Committee reported to the Commission on the former's activities in cooperating with broadcasters in promoting education through the medium of radio. "It is a mutual necessity," commented this FREA report, "that broadcasters and educators shall work together for the solution of the problems of education through radio in the truly democratic manner represented by the Federal Radio Education Committee." The latter, created in 1935, has conducted studies and otherwise operated under various grants from broadcasters, educational groups, and foundations.

6. TELEVISION BROADCAST SERVICE

At the beginning of the fiscal year, the Television Committee of the Commission, composed of Commissioners T. A. M. Craven, Norman S. Case, and Thad H. Brown, was charged with the duty of investigating and submitting findings with regard to the fixing of television transmission standards by the Commission and the disposition of a number of applications pending before the Commission for new television stations. The results of its studies were published in the committee's second report on November 15, 1939. The committee noted that certain progress had been achieved in television broadcasting since its first report of May 22, 1939. It was felt by the committee that although the television industry had not advanced beyond the experimental stage, it had arrived at the point where more rapid progress could be expected by the licensing of a class of station to render sponsored programs to the public on a limited basis. A revision of the Commission's rules to make this proposal effective was recommended although the committee recognized that the development of television was still in a state of flux and asserted that—

No interests should be permitted to raise public hopes falsely, nor to encourage public investments where the state of scientific or economic development leaves any doubt that such hopes and expenditures are justified for the use of the public property in the radio spectrum.

On December 22, 1939, the entire Commission tentatively adopted the rules recommended in this second report of the Television Committee, with minor modifications, and on the same date all parties interested in these proposed rules were invited to participate in a public hearing on January 15, 1940, before the Commission.

JANUARY HEARING

Leading concerns engaged in experimentation and research in the television field appeared and gave evidence upon the matters under investigation. This hearing extended over a period of 8 days, voluminous evidence was presented by the parties, and expression of opinion of different members of the industry with respect to the proposed rules was offered. The witnesses differed considerably in their views regarding the Commission recognizing or adopting the transmission standards which had been previously submitted to the Commission by the Radio Manufacturers Association.

Upon consideration of the record of the January hearing, the Commission adopted rules governing television broadcast stations which provided for two classes of television stations—class I and class II stations—indicating experimental research stations and experimental program stations, respectively. The rules provided that beginning September 1, experimental-program stations could defray the cost of producing programs by limited sponsorship. However, the Commission, in its report on said hearing, found:

Actual demonstrations to members of the Commission indicate the need for further improvement in the technical quality of television. The evidence before the Commission reveals a substantial possibility that the art may be on the threshold of significant advances. Research in fact does and should continue in significant phases of the field. * * * The issuance or acceptance of transmission standards by the Commission, especially in combination with the more extensive experimental program service which will in all probability develop under these rules, would have a tendency to stimulate activity on the part both of manufacturers and the public in the sale and purchase of receivers for home use. It is inescapable that this commercial activity inspired and then reinforced by the existence of Commission standards would cause an abatement of research. To a greater or less extent the art would tend to be frozen at that point. Even more important, nothing should be done which will encourage a large public investment "in receivers which, by reason of technical advances when ultimately introduced, may become obsolete in a relatively short time. * * * It will be realized, * * * that the loss to the public by premature purchase in a rapidly advancing field might in a relatively short period exceed many times the present total cost of research."

APRIL HEARING

On March 22, the Commission took cognizance of promotional activities in connection with the sale of television transmission and receiving equipment by a certain firm. Appreciating that such activities were contrary to the public interest by unduly retarding further research and development in the achievement of higher standards for television, the Commission suspended the effective date of the beginning of limited commercial operation of television stations and a further hearing was held on April 8. The parties who appeared and submitted evidence at this hearing were, with few exceptions, the same as those who participated in the Commission's January hearing.

Upon the evidence given at the April 8 hearing, the Commission decided that in order to insure to the public a television system which is the product of comprehensive research, the standards of transmission should not be determined at that time. It was further decided that no commercial broadcasting with its possible adverse effects on technical experimentation would be permitted until such time as the problem of

transmission standards was fully explored. It was stated that a single uniform system of television broadcasting was essential and that the Commission would authorize full commercialization whenever the industry agreed upon standards insuring a satisfactory level of performance.

PRESENT PROMOTIONAL RULES

The Commission adopted rules embodying the principles arrived at pursuant to the April hearing and announced the conditional granting of 23 pending applications for new stations, provided that the applicants for these facilities submit experimental proposals for the development of a uniform system of transmission standards of acceptable technical quality. Subsequent grants gave assurance that television research would be undertaken throughout the Nation. Various licensees reported that an aggregate of \$8,000,000 was available for this developmental work.

As previously noted, the advent of frequency modulation made it necessary to remove from the television service the band 44000 to 50000 kilocycles, substituting therefor 60000 to 66000 kilocycles, and allocating 156000 to 162000 kilocycles to other services licensed by the Commission, although the total facilities available for future use of television below 108000 kilocycles remained the same.

By the close of the fiscal year a National Television Systems Committee had been organized under the auspices of the Radio Manufacturers Association to explore existing television systems with a view to developing and formulating standards which would be acceptable to the industry as a whole and expedite the inauguration of a basically sound national system of television. With the Commission licensing a widespread number of stations for the purpose of developing standards and the coordinated work of this committee, it is hoped that sufficiently efficient transmission standards may be evolved which will enable the Commission to establish a commercial television broadcast service.

OTHER DEVELOPMENT

Meanwhile, promising experiments with color television are under way, licensees are developing a special studicraft for television production, and there is increased use of larger screens for projection purposes.

Portable television equipment has been developed whereby programs may be originated outside of main television studios. This equipment is light weight and readily transportable and operates on frequencies above 300000 kilocycles. On many occasions outdoor events have been successfully broadcast by television stations. In some cases television programs have been originated in aircraft. As stated in another section of this report the proceedings of a recent political convention in Philadelphia were transmitted to New York by coaxial cable and there broadcast to a number of home television receivers.

There is under development a system of television relay stations for the distribution of television programs between cities similar to the national standard broadcast networks.

7. INTERNATIONAL BROADCAST SERVICE

The program service of international broadcast stations has improved during the past fiscal year, particularly as regards South

America. In foreign countries there has been increased interest in the news programs by such stations located in the United States.

The Commission's rules now require domestic international broadcast stations to operate with a power of not less than 50 kilowatts. This is to enable the privately owned United States stations to compete more effectively with government-owned stations of other countries. This provision, originally scheduled to become effective July 1, 1940, was subsequently extended to January 1, 1941. By September 1940, nine such stations were using or were authorized to use the minimum power (50 kilowatts) deemed by the Commission as necessary for satisfactory international service. A domestic international broadcast station is required to use directional antennas which increase the effective radiated power by a factor of 10 in the direction of the country or countries which it is desired to serve.

South America is subjected to a barrage of transmissions from European stations, which are more favorably located for such communications, but it is anticipated that henceforth the United States stations will obtain better coverage in the Latin-American republics. A number of United States broadcasting and manufacturing companies expend large sums of money annually in the operation of these international broadcast stations to promote goodwill abroad for the United States although very little monetary return is received.

During the year a hearing was held on the petition of Mayor Fiorello H. LaGuardia of New York City to amend the Commission's rules so as to permit noncommercial and nonprofit standard broadcast stations to rebroadcast the programs of international stations for home consumption. Upon consideration of the evidence at this hearing the Commission amended its rules so that all standard, high-frequency, and noncommercial broadcast stations may pick up and rebroadcast the noncommercial programs of international stations on an equally non-commercial basis.

8. RELAY BROADCAST SERVICE

The use of relay facilities by standard broadcast stations for the transmission of outside programs from locations where wire facilities are not available has increased. At the close of the fiscal year 503 such stations were licensed by the Commission.

Relay stations have been utilized in the broadcasting of many events of national interest and importance. In certain cases it was desirable to relay programs over long distances where wires or other communication services were not available. For that purpose frequencies having long-distance characteristics were granted by special temporary authorization to licensed relay broadcast stations.

The Commission has amended its rules so as to permit a maximum power of 100 watts for stations operating between 30000 and 40000 kilocycles so as to make possible a better service by these stations. The use of 100 watts is authorized on the condition that no interference is caused to Government stations operating on adjacent frequencies.

There has been a certain amount of interest in the use of frequency modulation by relay broadcast stations. A group of four 200-kilocycle channels is available for such stations in the region between 156000 and 162000 kilocycles.

In some cases relay broadcast stations are authorized to transmit standard broadcast programs between the studio and transmitter in the absence of wire facilities. In many cases the fidelity possible with existing telephone lines is limited, so the Commission may soon authorize the use of relay broadcast facilities to high-frequency broadcast stations which are required to transmit programs with a wide range of frequencies and low background noise content.

9. FACSIMILE BROADCAST SERVICE

At the close of the fiscal year there were 16 outstanding authorizations for facsimile broadcast stations and 7 special experimental authorizations to standard broadcast stations to transmit facsimile signals between the hours of midnight and local sunrise.

The hearing on high-frequency broadcasting developed the fact that facsimile signals could be multiplexed with the regular program when using FM (frequency modulation) transmission. In other words, the aural and facsimile programs could be sent independently yet simultaneously over the same station. The Commission has made provisions for authorizing high-frequency broadcast stations to transmit facsimile signals by multiplexing on a secondary basis together with the aural broadcast program. It is likely that this mode of operations will encourage facsimile broadcasting during the regular broadcast day.

10. DEVELOPMENTAL BROADCAST SERVICE

The term "Developmental Broadcast Station" means a station licensed to carry on development and research for the advancement and improvement of various kinds of broadcast services. This type of authorization aims at developing equipment useful to broadcasting in general. Regular program service by such stations is not generally authorized.

Research conducted during the past year includes the development of a polyphase broadcasting system whereby operating economies may be effected for high power standard broadcast stations, experimentation pertaining to the development of tubes and apparatus for operation at powers of 100 to 500 kilowatts, and the further improvement of transmitters and associated equipment for high frequency amplitude and frequency modulation transmission. A revision of some of the high frequency channel assignments for developmental broadcast stations became necessary following the reallocation under order No. 67 providing for commercial high frequency broadcasting.

CHAPTER VII

Safety of Life and Property

- 1. GREAT LAKES AND INLAND WATERS**
- 2. MARINE SERVICE**
- 3. AVIATION SERVICE**
- 4. EMERGENCY SERVICE**
- 5. EXPERIMENTAL SERVICES**
- 6. ALASKAN STATIONS**
- 7. MISCELLANEOUS SERVICES**

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CHAPTER VII—SAFETY OF LIFE AND PROPERTY

1. GREAT LAKES AND INLAND WATERS

GREAT LAKES SURVEY

The special study of radio requirements necessary or desired for safety purposes for ships navigating the Great Lakes and inland waters has been concluded, and the final report of the Commission to the Congress was in preparation at the close of the year.

The survey as submitted to the Commission on December 11, 1939, by Commissioner Thad H. Brown, contains 621 pages analyzing 3,167 pages of testimony and 341 exhibits which were introduced at hearings. This study was made pursuant to Section 15 of Public Order No. 97 approved by the 75th Congress May 20, 1937. By Public Resolution No. 441 of the 76th Congress, the time for making Commission report to Congress was extended from December 31, 1939, to January 1, 1941.

Following conferences in 1938 with officials of the Department of Transport, Dominion of Canada, representatives of the Commission and other interested departments of the United States Government again conferred informally with Canadian officials at Montreal, Canada, on October 12 and 13, 1939. Consideration was given to mutual problems concerning the increased voluntary use of radiotelephone communication in the short-distance maritime mobile service of Canada and the United States, and considerable factual data which had been accumulated during the course of the survey were carefully reviewed. In addition, a satisfactory basis was established for further cooperation between the two governments looking toward possible adoption of uniform ship radio requirements for safety purposes on the Great Lakes.

GREAT LAKES RADIOTELEPHONE SERVICE

With the cooperation of the State Department, the temporary regional arrangement providing for uniform frequency assignments and standardized operating procedure in the Great Lakes radiotelephone service, which had been placed in effect by the Commission and the Department of Transport of the Dominion of Canada for the year ending March 31, 1940, was revised and renewed on May 1, 1940.

It was agreed that this arrangement will continue until need arises for further changes, unless it is previously renounced by either of the two governments. Temporary rules of the Commission in accordance with the regional arrangement, which were initially promulgated in the early part of 1939, expired February 1, 1940, and were replaced on April 1, 1940, by similar rules (applicable only to stations in the Great Lakes area) presently included in the regular rules of the Commission governing ship and coastal services. It is the purpose of these rules to provide for the most effective use of radiotelephone frequencies and equipment, to minimize interference, and to afford interested ship-owners and radio-station licensees the proper opportunity to voluntarily develop and increase the effectiveness of short-distance maritime

telephony for safety purposes on an internationally uniform basis in the Great Lakes area. An increase during the fiscal year in the number of vessels on the Great Lakes having licensed radiotelephone stations from 146 to 226 American vessels and from 50 to 71 Canadian vessels indicates the trend toward telephony and illustrates the need for the joint regional operating arrangement.

From March 4 to March 8, 1940, a hearing was held at Cleveland, Ohio, to determine whether frequencies between 4000 and 15000 kilocycles should be made available for use in the Great Lakes region in order to provide radiotelephone communication between vessels on the Great Lakes and points on shore over distances comparable to those successfully covered on frequencies in the regular coastal-harbor band 2000 to 3000 kilocycles along the seacoast, where the presence of salt water is favorable to efficient use of these lower frequencies. It was shown that the required distances cannot be obtained economically on the lower frequencies over the fresh water of the Great Lakes. Consequently, the Commission on April 16, 1940, made available for this service, in the Great Lakes area only, three pairs of frequencies between 4000 and 9000 kilocycles to supplement use of the basic 2000 to 3000 kilocycle band.

Experience gained during the 1939 season of navigation on the Great Lakes emphasized the desirability, particularly for safety purposes, of having a uniform radiotelephone communication service on the assigned frequencies between 2000 and 3000 kilocycles, which are used primarily for short distance ship-shore and inter-ship telephony. To this end, further changes were made, effective May 1, 1940, in the joint arrangement between Canada and the United States. Briefly, it provides for the use on a regular basis of a common calling and safety frequency for all Great Lakes ship telephone and coastal-harbor stations, including government stations; for an exclusive frequency pair for communication between United States ships and shore, and a similar pair for Canadian ships. A third frequency pair was made available for the ship-to-shore radiotelephone service of ships of any nationality on the Great Lakes. Recommendations for operating procedure to minimize interference between Great Lakes radio stations of Canada and the United States operating in the maritime radiotelephone service were agreed upon and incorporated in the regular rules effective April 1, 1940.

GREAT LAKES ENGINEERING STUDIES

From July 26 to August 29, 1939, a temporary monitoring station was operated by the Commission's engineers at the United States Coast Guard Station, Marblehead, Ohio, on the shore of Lake Erie. The equipment used consisted of six radiotelegraph and radiotelephone receivers of modern design, together with automatic instruments for recording in graphic form the currently prevailing atmospheric noise-level or "static" on radio frequencies within the bands most useful for maritime safety communications. Electrical noise interference to radio reception, other than natural static, was practically nonexistent at this location, which condition was very desirable for the purpose of the measurements. Considerable data were accumulated at this monitoring station during the month of August 1939 pertaining to the intensity of the prevailing static levels and

the practical operation of ship and shore radiotelephone stations in the Great Lakes region. Important points of operation brought out by these observations were incorporated into the record of the September hearing at Washington.

Approximately 1,500 pages of radiotelephone logs from ships navigated on the Great Lakes were examined at Cleveland. These logs had been compiled by licensed radiotelephone operators and navigating officers on board cargo vessels operating on regular trade routes during the period July 15 to August 14, 1939, a time of the year when atmospheric interference to radiocommunication occurs frequently and at high intensities. Subsequently, the data obtained from these logs were analyzed to bring out certain information of fundamental value to the survey and the results were made the subject of engineering testimony at the final hearing.

2. MARINE SERVICE

EXEMPTION FROM COMPLIANCE WITH TITLE III, PART II

The International Convention for the Safety of Life at Sea, London, 1929, and part II of title III of the Communications Act authorize the Commission to grant exemptions from prescribed radio requirements to certain vessels or classes of vessels when navigated under specified conditions, provided the Commission considers that the route or other circumstances of the voyage are such as to render compliance unnecessary or unreasonable.

During the fiscal year requests received for such exemption were few in number in contrast to the period immediately following the enactment of title III part II of the act.

The Commission renewed the exemption previously granted to numerous small passenger vessels of United States registry below 100 gross tons. Under the conditions of this exemption, the permissible distance of navigation from the nearest land is restricted to not more than 20 nautical miles (except as indicated) in the following areas:

- (1) Between Beaufort, S. C., and Fernandina, Fla.
- (2) In the vicinity of Miami, Fla., between Hillsboro Light and Triumph Reef Beacon.
- (3) Between Naples, Fla., and New Orleans, La.
- (4) Between Point Conception, Calif., and Los Coronados, Lower California.
- (5) Between Key West, Fla., and Dry Tortugas, Fla. (not more than 5 nautical miles from the nearest land).

The general exemption originally granted by the Commission on May 17, 1938, to small passenger vessels of United States registry up to and including 15 gross tons, as a class, was again renewed, as were the exemptions previously granted to a few United States vessels of more than 100 gross tons which are subject to navigation in accordance with the various restrictions and distance limitations specified by the Commission.

Exemption of a temporary nature was granted to several vessels engaged on trial voyages immediately after construction, or to permit continued operation with existing radio equipment pending procurement and installation of radio equipment required by law, which was not readily available in these instances.

The passenger vessels to which extended exemption has been granted, with few exceptions, are engaged in the sport-fishing, sight-seeing, pleasure, and water-taxi business, and in many cases are equipped with low-power radiotelephone or radiotelegraph equipment which can be used for communication with Coast Guard, coastal-harbor radiotelephone and ship stations in event of emergency.

VIOLETIONS AND DEFICIENCY REPORTS

During the past year some 3,467 deficiency reports were served in connection with enforcement of the operation, maintenance, and installation of ship radio equipment required by part II of title III of the Communications Act and relevant regulations of the Commission. This represents a decrease of 633 from the number served during the preceding fiscal year. It may be attributed to the fact that those responsible for compliance were more familiar with the law and its application, and also because 14,107 ship inspections were conducted during the past year in contrast to 16,341 ship inspections performed the previous year.

Flagrant violations of part II of title III of the Communications Act necessitated the application of forfeiture in the sum of \$3,000 against one vessel, and of \$2,500 in another instance, as well as a \$100 forfeiture against the master in the latter case. A forfeiture of \$100 was also declared against the master of an additional vessel, but was remitted by the Commission because of his death.

COASTAL TELEPHONE

There has been no change in the number of coastal telephone stations as reported in the previous fiscal year. There are seven American transatlantic and transpacific passenger vessels licensed to handle public telephone communications with this class of station. The number of foreign ocean-going ships communicating with coastal telephone stations of the United States has diminished greatly from the previously reported figure of 23, mainly due to their withdrawal from commercial service or loss during the current European war.

COASTAL-HARBOR STATIONS

During the past year licenses were granted for new public coastal-harbor stations at Galveston, Tex., and Port Sulphur, La., and for a second communication channel at the New York station. The experimental status of two stations located at Philadelphia and Port Petrol [Calif.], respectively, operating on frequencies above 30000 kilocycles, was discontinued and they were licensed for public coastal-harbor service. After formal hearings permits were granted for the construction of new coastal-harbor stations at Cape Girardeau, Mo., Mackinac Island, Mich., Tampa, Fla., Delaware City, Del., Charleston, S. C., and at Astoria and Portland, Ore. As of June 30, 1940, there were 18 coastal-harbor stations in the United States and Puerto Rico licensed to provide public radiotelephone service. Applications were pending for new coastal-harbor stations at Rogers City, Detroit, Port Huron, Houghton, and Manistee, all in Michigan; at West Dover, Ohio; and at Buffalo, N. Y. Hearings were held May 18 to 29 on these applications and on applications for additional facilities for the existing Great Lakes coastal-harbor stations. Decisions were pending at the close of the fiscal year.

MISSISSIPPI RIVER SERVICE

According to information presented at the Great Lakes survey hearings, commerce on the Mississippi River and its tributaries is rapidly assuming an increased importance. The Commission has been requested by several applicants to allocate additional frequencies within the band 2000 to 3000 kilocycles to provide radiotelephone communication for safety and commercial purposes between ship and shore on these waterways. Public coastal-harbor stations have been authorized at Memphis, Tenn., and Cape Girardeau, Mo., and a number of applications have been received for authority to establish land stations at other points on these rivers to provide public radiotelephone service to boats. Recognizing that the additional frequencies requested are not available under present circumstances and that special allocation problems are involved if a comprehensive radiotelephone service is to be provided for this area, the Commission conducted an informal hearing October 28, 1940, at Memphis to acquire more complete information concerning the need and nature of the desired service.

COASTAL TELEGRAPH

During the past year the licenses were voluntarily surrendered for the general public service coastal telegraph stations at Portland, Oreg., and Fort Morgan and Mobile, Ala. A construction permit was issued for a new station of this class at Mobile and a license was granted for a public coastal telegraph station at Boulder City, Nev., to provide a communication service, fundamentally for safety purposes, for boats on Lake Mead, the lake formed by impounding the waters of the Colorado River behind Boulder Dam. Otherwise there has been no change in the number of coastal telegraph stations licensed by the Commission other than those in the Territory of Alaska.

Owing to the European war and the consequent withdrawal from service of many transatlantic ships, there has been a marked decrease in the activity of many American coastal telegraph stations. The volume of message traffic handled by these stations has been further affected adversely by the reluctance of the masters of ships of belligerent countries to permit the use of the ships' radio transmitting equipment during time of war.

SHIP TELEPHONE AND TELEGRAPH

As of June 30, 1939, there were 1,561 vessels equipped with ship radiotelephone stations licensed by the Commission to communicate with coastal-harbor stations. On June 30, 1940, this number had increased to 2,773 vessels. More than 226 ship radiotelephone stations were licensed by the Commission for service on the Great Lakes. At the same time there were 91 Great Lakes ship radiotelegraph stations of United States registry, representing a 40-percent reduction in the number licensed for telegraphy the preceding year. Of the total number of 4,314 ships licensed for radio communication as of June 30 last, 1,541 ships were licensed for telegraph service.

With the considerable growth in the number of ship radiotelephone stations there have arisen serious interference problems. These problems are caused principally by the corresponding increase in the volume of radiotelephone messages handled free of charge between ships, and by the fact that only one message frequency (except

for certain ultra-high frequencies not fully developed) is available for this intership telephone communication at present. Consequently, the Commission has adopted and placed into effect new rules prohibiting unnecessarily long and superfluous conversations, as well as rules pertaining to procedure in the ship radiotelephone service designed to minimize interference and expedite the exchange of message traffic. Notwithstanding the adoption of these measures, the Commission has been urged by the operators of small boats equipped with radiotelephones to provide additional communication channels for the intership telephone service and consideration is being given to the allocation problem which this involves. To relieve congestion on the intership frequency of 2738 kilocycles, the Commission on September 4, 1940, modified its rules to permit the use of the 2638 kilocycles frequency for radiotelephone communication between vessels.

During the past year, a frequency suitable for reliable communication over short distances was made available by the War Department for use by nongovernment ship stations to provide radiotelephone communication between vessels navigated on bays, sounds, and inland waters and the official dispatching stations located along the Chesapeake and Delaware Canal and the Cape Cod Canal. The use of this radiotelephone service has been beneficial in arranging for the safe and expeditious passage of vessels through these waterways.

By regional arrangement with the Canadian Government, adopted in 1929, the radiotelegraph stations in the maritime mobile service on the Great Lakes have utilized 410 kilocycles for calling and distress purposes instead of the internationally established 500 kilocycles used at sea. This arrangement provided a frequency separation between these stations in the marine service on the Great Lakes and the nearest broadcast station frequencies which was generally adequate to avoid interference between the two services. Gradual improvements in the design of radio receiving equipment since 1929 and the abolition of the use of all damped wave transmitting apparatus by ship radio stations of the United States and Canada during the past year have made it possible for the ship and coastal radiotelegraph stations on the Great Lakes to adopt the standard 500-kilocycle wave for calling purposes and for distress communication in conformity with the world-wide use of this frequency.

MARINE RADIO EQUIPMENT

There was marked improvement during the year in the radio equipment used on board ships in the maritime mobile service. Particularly is this true with respect to radio transmitting equipment in use on board vessels subject to title III, part II of the Communications Act. This improvement has been brought about as the direct result of two separate and distinct movements in the interest of safety of life and property at sea, the one national and the other international in scope. The first, in point of time, was an international movement to prohibit, except under certain limiting conditions, the use of equipment employing damped wave emissions, culminating in the adoption by the Cairo Conferences in 1938 of a provision that the use of damped wave emissions be prohibited beginning

January 1, 1940, except for ship transmitters with less than 300-watts input. The purpose of this action was to make possible a larger number of simultaneous communications in a given band of frequencies without serious interference. The other was a movement to raise ship radiotelegraph transmitter standards with respect to both quality of emissions and adequacy of available power for the transmission of intelligence in cases of emergency to a degree commensurate with present-day conceptions of safety.

As previously reported,¹ the antenna power requirement for ship stations deemed necessary by the Commission to satisfy the 200 nautical mile distance provision of section 354 (d) of the Communications Act met with objection from certain shipowners and, on the Commission's own motion, the matter of investigation of power requirements for ship radio transmitters was designated for hearing. Upon the basis of a formal public hearing conducted from November 14 to 18, 1938, by Commissioner T. A. M. Craven, and the presentation of oral argument before the Commission by representatives of the ship owners on July 13, 1939, the Commission, on July 26, 1939, adopted Commissioner Craven's report as the report of the Commission. It accordingly further modified its "Ship Radiotelegraph Safety Rules" upholding the initial antenna power requirement, but alternately expressing the same in terms of field intensity at a distance of 1 nautical mile over sea water.

The modified rules provided that a main transmitter having an operating power somewhat less than that required by these rules would be temporarily approved not later than January 1, 1940, and that an existing main transmitter installed prior to July 26, 1939, on board a subject vessel would be approved on the basis of a demonstration, before January 1, 1940, of its capability, when operated on the international distress frequency, to produce a field of specified intensity at a distance of 1 nautical mile over a sea-water path. There were no shipowners, however, who took the opportunity under the modified rules to demonstrate the adequacy of the transmitters which did not meet the power requirement of the original rules.

In order to promote uniformity in its various regulations, the Commission on October 1, 1939, approved its "Rules Governing Ship Service," superseding its "Ship Radiotelegraph Safety Rules." The sections of the rules governing ship service which relate to ship radiotelegraph transmitters required for vessels subject to the provisions of title III, part II of the Communications Act contain substantially the same requirements as those of the superseded safety rules.

The discontinuance, on January 1, 1940, of the use by ship stations of the United States of all transmitting equipment employing damped wave emission in compliance with the General Radio Regulations (Cairo Revision, 1938) and the rules of the Commission promulgated in pursuance thereof, has² brought about the replacement of obsolete spark transmitters with the installation of modern transmitting equipment employing vacuum tubes. On the same date, the use of relatively low-powered main radiotelegraph transmitters

¹ See p. 63 of Fifth Annual Report of Federal Communications Commission for Fiscal Year Ending June 30, 1939.

² See art. 7, sec. 10, of the General Radio Regulations (Cairo Revision), 1938, and sec. 8.71 of the Commission's Rules Governing Ship Service.

in favor of transmitters having higher power on board ships of the United States was discontinued in compliance with the Commission's³ new rules.

In anticipation of a demand, on the part of United States Government departments and private shipowners of the United States, for new and improved types of marine radiotelegraph equipment, and in order to meet new international and United States Government requirements, the leading manufacturers of radio equipment of this classification have developed a number of new models which reflect recent advancements made in the radio art.

In line with the Commission's policy to approve types of equipment after satisfactory demonstration of their capability of meeting the requirements of the rules governing a specific service, and in accordance with sections⁴ of its "Rules Governing Ship Service," certain types of ship radiotelegraph transmitters have been approved as capable of meeting the requirements of applicable sections of these rules as listed in the statistical chapter of this report.

The approval of specific types of radio receivers, radio direction-finders, radio lifeboat equipment and automatic alarm-signal keying devices, for use on vessels required by law to be equipped with apparatus of these classifications, has been held in abeyance pending further detailed studies looking toward the promulgation of "Standards of Good Engineering Practice for Ship Stations."

Studies have been made and are being continued for the purpose of ascertaining the needs of the maritime mobile service with reference to the promotion of safety of life and property at sea. The results of these studies will be reflected in the "Standards of Good Engineering Practice for Ship Stations."

AUTOMATIC ALARMS

The results of the Commission's studies of automatic alarm receivers as used in compliance with law on board ships at sea are further reflected in its final approval of three types of these alarms heretofore tentatively approved. Order No. 66, of March 29, 1940, provides that approval of a particular individual automatic alarm receiver of any one of the three approved types shall not extend beyond 7 years following the date when the particular alarm in question was first put in service on board a ship; with the reservation that approval may be withdrawn, should it be determined at any time that an alarm no longer meets the specific requirements of the Commission. A further reservation is included which contemplates revision of the specific requirements of the Commission relating to automatic alarm receivers when deemed necessary or desirable. It is to be expected that such a revision will be made from time to time in order that this important item of radio safety equipment may be improved in accordance with the latest technical developments.

As of June 30, 1939, there were approximately 1,100 automatic alarm receivers, approved under the Commission's order No. 66, installed on board ocean-going cargo vessels of United States registry.

³ See sec. 8.143, par. (c), of the Commission's Rules Governing Ship Service.

⁴ See secs. 8.141 and 8.148 of the Commission's Rules Governing Ship Service.

[A list of approved types of automatic alarm receivers is contained in the statistical chapter.]

SEA DISASTERS

During the fiscal year, there were at least 63 instances of distress in which the international automatic alarm signal was transmitted, 49 of which occurred in European waters as a result of the war. In the early part of that conflict, prior to passage of the Neutrality Act and before ships of United States registry were forbidden by law to enter designated combat areas, American vessels participated in the rescue of hundreds of persons from foreign vessels which had met disaster. Some of these cases on which the Commission accumulated information relative to the use of radio are outlined in the following paragraphs:

On September 3, 1939, the auto alarm signal was sent at 2210 GMT by the British coastal station at Valentia, England, for the British passenger liner *Athenia*. Two hundred and twenty-three survivors were rescued by the Swedish yacht *Southern Cross* and through arrangements made by radio communication were thereafter transferred to the American steamship *City of Flint* and finally disembarked at Halifax, Nova Scotia.

On September 7, 1939, the passenger steamship *Washington* of United States registry rescued 33 persons from the British steamer *Olive Grove*. The British coastal station at Valentia, England, sent the warning signal "SSSS" at 1424 GMT, thus indicating the presence of a submarine in the vicinity of the *Olive Grove*.

The crew of the Irish steamer *Inverliffey* was rescued by the United States tanker *R. G. Stewart* on September 11, 1939. The warning signal "SSSS" was transmitted by the *Inverliffey* at 1359 GMT on the same date.

The steamship *American Shipper* of United States registry deviated 150 miles from its course to pick up 32 survivors from the British freighter *Blairlogie*, for which the British coastal station at Valentia sent "SSSS" at 0400 GMT on September 11, 1939.

The United States steamship *Scannepenn* rescued the crew of the British steamer *Firby* on September 11, 1939. "SSSS" was sent at 1456 GMT by the latter.

At 1609 GMT on September 17, 1939, the British coastal station at Lands End, England, sent "SSSS" for the British steamer *Kafiristan*, after which the steamship *American Farmer* of United States registry rescued 29 persons from the distressed vessel.

Fifty-five members of the crew of *H. M. S. Courageous* were rescued by the United States ship *Collingsworth* on September 18, 1939.

The United States passenger steamship *President Harding* saved the entire 36 members of the crew of the British steamer *Heronspool* while proceeding to the distress of the French tanker *Emile Miguet* on October 12, 1939.

The United States steamship *Black Hawk* rescued 39 of the crew of 40 of the French tanker *Emile Miguet*. The British coastal station at Lands End sent "SSSS" at 1835 GMT on October 12, 1939, on behalf of the latter vessel.

Two hundred and twenty-three survivors from the British steamers *Yorkshire* and *City of Mandalay* were rescued by the steamship *Independence Hall* of United States registry on October 17, 1939, subsequent to the transmission of the warning signal "SSSS" by an unidentified station at 0833 and 1730 GMT on that date.

The United States motor vessel *Crown City* picked up 60 survivors from the British steamers *Ledbury* and *Manin Ridge* on October 24, 1939, following the transmission of "SSSS" by an unknown station at 0858 GMT on that date.

These rescues serve to effectively demonstrate the important element of safety at sea which is afforded by the presence of radiotelegraph installations and watches by qualified operators on board oceangoing vessels.

The passage of the Neutrality Act and related Proclamation by the President of the United States on September 5, 1939, forbade the

operation of merchant vessels of United States registry in designated combat areas, thus removing the possibility of American ships thereafter being in positions whereby they could proceed to the assistance of distressed vessels in those waters.

Although there were no major distress cases which occurred during the past fiscal year in waters adjacent to the continental United States, the following two cases on which available information was reviewed are believed to be of significant interest to warrant mention.

On April 27, 1940, at 2:00 GMT, the American steamship *Yankee Arrow* transmitted the auto alarm signal in an attempt to contact any ship within the vicinity for the purpose of obtaining the services of a doctor and medicine to revive a man who apparently had been drowned. Through the radio facilities of the coastal telegraph station at Savannah, Ga., the Public Health authorities had prescribed the use of adrenalin, which was not available on board the *Yankee Arrow*. Although attempts were made to obtain this drug, unfortunately these were not successful. This is the first case on record whereby the auto alarm signal was used in an attempt to save the life of a man by attracting the attention of vessels in the vicinity which might have had a physician on board. In this case, automatic alarms on 16 American vessels responded to the signal transmitted by the *Yankee Arrow*.

At 2200 GMT, July 18, 1939, the American steamer *Associated* received a distress message from the Japanese steamer *Bokuyo Maru* in latitude north 36.38 and longitude east 159.03, stating that the vessel was foundering following an explosion and fire. The Japanese vessel was approximately 80 miles from the *Associated* which was 1,200 miles east of Yokohama, en route to San Francisco from Manila. The *Associated* proceeded to the scene and rescued 209 of the 212 passengers and crew of the Japanese steamer, mostly Oriental and Hindu women and children returning home from Chile. The following day, all the survivors were transferred to the Japanese steamer *Florida Maru* which was en route to Japan.

Studies carried on in preceding years of the use and operation of radio stations and wire-line service in connection with furnishing emergency aid to ships at sea and the maintenance of special marine safety watches at Baltimore, Md., and Portland, Oreg., were continued during the past fiscal year to a limited extent in view of the abnormal conditions created by the war. Studies of distress cases and conclusions reached under these circumstances obviously are not indicative of the normal procedure followed in times of peace.

SHIP AND COASTAL SERVICE RULES CLARIFIED

Substitution of the term "limited (governmental)" for "private" is involved in modification and clarification of the rules governing ship and coastal services by action of the Federal Communications Commission, effective March 1, 1941. This was prompted by the fact that the word "private" does not adequately describe such a limited service station. A station of this class is restricted to use for governmental purposes and is available to Federal, State, county and municipal agencies, and to other persons or organizations only for the purpose of performing services for such governmental units.

3. AVIATION SERVICE

In general, the development of aviation and communication has gone forward with the increase in volume of air transportation. The Commission's rules reported in the last annual report were found satisfactory and it has only been necessary to provide additional frequencies to accommodate the increased aircraft schedules.

DOMESTIC AVIATION

At the close of the fiscal year a total of 1,875 stations were licensed in the aviation service, including 1,294 aircraft, 345 aeronautical, 141 aeronautical fixed, 82 airport, and 13 flying-school stations.

Increasing passenger, mail, and express loads have resulted in the addition of many aircraft flights to scheduled operation. Requirements of air-traffic control with respect to the frequent report of aircraft positions have been reflected in an increase in the volume of communications required to be handled. Although additional frequencies necessary to accommodate this increasing communication load have been found, it is becoming more and more apparent that the frequency bands at present used cannot continue to handle the mounting volumes of communication. In order to find room for expansion a great deal of experimental research has been conducted into the possibility of using frequencies of the order of 130 megacycles for air-ground communications, and it is expected that during the next fiscal year equipment will be installed on board communication air transports for the purpose of giving this new band of frequencies service tests.

Air transport routes have for some time connected the United States and Canada. The Commission has enjoyed the utmost cooperation with the Canadian administration in handling the communication problems arising through this international operation. Specifically, in connection with the routes from Montreal to New York City and the projected route from Toronto to New York City arrangements were made for the use of frequencies by United States stations on which Canada had prior rights.

AIRPORT TRAFFIC CONTROL

As a result of the development of equipment and because of technical reasons, the band of 200 to 400 kilocycles has been used generally for radio ranges. Within this band the single frequency 278 kilocycles has been designated as the frequency to be used by airport control towers in directing the movements of air traffic in the vicinity. A single frequency has now become insufficient to handle all the communications that are necessary for airport traffic control purposes. Preliminary research having indicated their suitability, the Commission has allocated six frequencies above 130 megacycles for use for airport traffic control. In order that the undesirable conditions now existing on 278 kilocycles may be corrected as soon as possible, the Commission required all those submitting applications for airport control stations after January 1, 1940, to make provision for the use of both 278 kilocycles and one of the six ultra high frequencies. In addition, the Commission requires that those desiring renewal of authorizations issued before that date must, by January 1, 1941, make provision for use of an ultra high frequency.

To illustrate the importance of this situation, two cases coming to the attention of the Commission are discussed in detail.

The first involved the opening of the LaGuardia Field in New York to commercial air transports. Within 30 miles of this new airport there were existing four airport stations: Roosevelt Field, Garden City, N. Y.; Floyd Bennett Field, Brooklyn, N. Y.; Newark Municipal Airport, Newark, N. J.; and the Islip Field, Islip, N. Y. Each of these airports was in active operation and it was obviously

impossible to expect a single frequency to handle the communications then existent as well as the communications expected to be required by the installation to be made at LaGuardia Field. As a result of conferences, authority was obtained from the Interdepartment Radio Advisory Committee for this Commission to license the airport stations at LaGuardia Field to use the frequency 362 kilocycles primarily assigned for radio ranges.

The second case involved the four airports in the Los Angeles metropolitan area. Here the United Airport at Burbank and the Municipal Airport in the City of Long Beach were both licensed to use 278 kilocycles and permission was sought by Santa Monica and Los Angeles to erect airport control stations at their respective municipal airports. These requests proceeded to a formal hearing, at Los Angeles, at which it was definitely established that the air traffic in the vicinity of Los Angeles required the use of four airports and that the four airports could in no way share the use of single frequency and adequately protect the landing and take-off operations of the number of aircraft in daily operation. In this case authority was obtained to license frequency 272 kilocycles for the shared use of the two new airport stations.

With the installation of equipment in aircraft and on ground for the use of ultrahigh frequencies this situation will be remedied. However, until such frequencies are in general use, congestion is to be expected at many points where aircraft operation is concentrated in a small geographical area.

NONSCHEDULED AIRCRAFT OPERATION

Considerable improvement has been noted in the standards of operation maintained by the nonscheduled operator. Many new lines of equipment designed specifically for use by this group of airmen have been placed on the market, and an ever increasing number of private aircraft operators are availing themselves of the benefits of radio communication even though the installation of two-way apparatus is not mandatory.

In cooperation with the private fliers and their representative organizations, the Commission has endeavored to make its rules as simple as possible consistent with its responsibility to promote the safety of life and property through the use of radio.

INTERNATIONAL AVIATION

Article 7 of the General Radio Regulations annexed to the International Telecommunication Convention (Cairo revision) establishes a number of intercontinental routes. In four of these the United States has primary interest: (1) Inter-American routes, (2) Trans-Pacific route, (3) European-North American route by North Atlantic, and (4) European-North American route by the Arctic.

Flights of the Inter-American routes (route 1) have continued with the steadily increasing number of schedules and an excellent record of safety. Stations licensed by the Commission serve these routes at Los Angeles, Calif.; Brownsville, Tex.; Miami, Fla.; and San Juan, P. R. In addition, communication facilities have been installed at various airports throughout Central and South America. During the year new aircraft equipment was provided which permitted the establishment of an airway directly across the interior

of Brazil. This reduced the distance between Miami and South American airports by more than 1,000 miles.

The disturbed conditions in the Orient curtailed service over the Trans-Pacific route (route 2). Regular flights have continued from San Francisco to Manila, and Los Angeles has been included as a regular stop on the portion of the route from San Francisco to Honolulu. Operation on that portion of the route from Manila to Shanghai and Peiping has been suspended. However, service to Canton was established, and a new route from San Francisco to New Zealand via Honolulu was placed in operation. Extension of this last route to Australia is contemplated.

The development of service over the European-North American route by the North Atlantic has been greater than was anticipated. However, it has proceeded along a different line because of the war situation. Service was inaugurated on May 20, 1939, but operations were affected by the Neutrality Act and the President's proclamation barring American ships from the combat zones. On September 1, 1939, European terminals were transferred from Southampton, England, to Foynes, Ireland, on the north lane, and from Marseilles, France, to Lisbon, Portugal, on the south lane. On October 7, 1939, service in the north lane was completely suspended. However, service on the south route was increased to twice weekly. Because of difficulties experienced in inspections at Bermuda, stops at that point were discontinued and service was changed from New York to the Azores and thence to Lisbon.

Exchange of weather information in the North Atlantic service suffered when ships of foreign registry discontinued such transmission. This necessitated a special provision for the collection and distribution of weather reports. Although the Commission is in no way responsible for this weather service, it was able to cooperate in the negotiations which have led to satisfactory service.

During the year the Civil Aeronautics Authority promulgated a standard procedure to be used in handling communications arising from cases of distress involving aircraft flight over the seas. The Commission and its licensees collaborated in the preparation of this document.

No regular flight from Europe to North America has been conducted by way of the Arctic (route 4). Several survey flights have been made, principally by the U. S. S. R. over this route, and it may well be that with the termination of hostilities regular service will be inaugurated. Service to Alaska from Seattle was initiated on June 24, 1940, and since such a route would logically be extended to Europe, it was established as a portion of the Arctic route, using the frequencies set aside for the route under the Cairo regulations.

The entire international system flown by the United States aircraft reaches 269 terminals and uses 146 radio communication stations.

4. EMERGENCY SERVICE

Under the "Emergency service" classification are included all stations devoted to the promotion of safety of life and property. Included are stations in the following classifications: State, municipal, inter-zone, and zone police; marine fire, forestry, and special emergency. During the past year there has been a tremendous increase in

the number of instrumentalities of government which have entered into the operation of equipment utilizing the ultra-high frequencies, only recently made available to these services on a regular basis.

NUMBER AND CLASSES OF STATIONS

The number of licensees operating facilities in the emergency service, together with the number of transmitters under license or construction permit, is shown in the table below:

Classes of stations	Number of licensees	Number of stations
State police.....	30	246
Municipal police.....	944	5,953
Interzone police.....	27	27
Zone police.....	26	64
Marine fire.....	4	14
Forestry.....	15	1,045
Special emergency.....	76	452
Total.....	1,122	7,801

This represents an increase of approximately 52 percent in number of licensees and 40 percent in number of stations under license or construction permit over the past fiscal year. The relatively tremendous growth of the emergency services is shown vividly by the fact that it has the third largest number of applications of any service, being exceeded only by applications for broadcast and ship service facilities.

At the present time, a number of facilities which ordinarily would be included under the emergency service classification are placed in the experimental class because of the fact that frequency modulation, rather than amplitude modulation, is being employed. It is considered likely that, before the end of the next fiscal year, enough data will have been secured on the stations using frequency modulation to permit their being included under their normal classifications. [For a more complete discussion of frequency modulation, see other sections of this report.]

POLICE STATIONS

There are at this time 37 intermediate frequencies and 29 ultra-high frequencies allocated to the various police services. All of the police stations formerly operating on an experimental basis on the ultra-high frequencies have been transferred to the emergency service on a regular basis, with the exception of those stations recently authorized to use frequency modulation. Even with the total of 66 frequencies which are available, the very large increase in the number of stations has caused the problem of interference to remain of paramount importance.

Experience has proved that the ultra-high frequencies are technically suitable for use by land, portable, and portable-mobile police stations when the area to be covered is not unusually large. In particular, these frequencies have been of great value to the smaller municipalities. These small towns and cities have a real need for radio in their police organizations, and since the cost of installation of the usually low-powered ultra-high-frequency equipment is more in line with their smaller budgets, hundreds of these municipalities have been able to avail themselves of the service. This would have been quite impossible had it been necessary for them to make a large monetary outlay for the

medium- or high-power conventional-frequency equipment and radiation systems.

Of particular interest is the rapidly growing group of interzone and zone police stations. To aid in relieving the serious congestion on the radiotelephone channels, as previously reported, the Commission has allocated certain frequencies for point-to-point communication by radiotelegraph only. These stations, all operated by various instrumentalities of government, are rapidly taking over the job of handling all necessary police point-to-point communications, thereby permitting the radiotelephone channels and facilities to be reserved for communications involving mobile units.

In general, police radio has proved itself of inestimable value to the law-enforcing agencies for the prevention and suppression of crime in all its phases, and for the quick apprehension of culprits after a crime has been committed. It is a matter of record that many criminals will avoid entering a town or city known to have a police radio system in operation, because they are fully aware of its effectiveness and know that their chance of escaping detection or evading capture is thereby minimized.

FORESTRY STATIONS

Radio is playing an increasingly important role in forest conservation work. It is not only a great aid in coordinating efforts to extinguish large forest fires, but is particularly valuable in preventing such fires by its ability to dispatch men to extinguish small fires before they reach the destructive stage.

In 1934 the Federal Radio Commission issued licenses for special emergency stations to be used in forest protection, and in 1939 the Federal Communications Commission established forestry stations as a separate classification and allocated specific frequencies for their use.

The United States Forest Service, the State departments of conservation, and private agencies owning and operating forest lands have equipped hundreds of fire lookout towers with radio equipment, and they have also equipped both men and vehicles with portable and mobile equipment so that a communication network is provided, permitting reliable and instantaneous communication between the bases of forest operation and the crews.

As the portable and mobile stations used in the forestry service must, of necessity, be very light and low-powered, they are unable to communicate over great distances. In order to make possible direct communication between the man in the field and his headquarters a number of experimental stations have been licensed in order that an automatic relay system making use of repeater stations may be developed.

MARINE FIRE STATIONS

The Commission has made available one intermediate and two ultra-high frequency channels for marine fire stations. This class of stations includes land stations for communication between fireboats and the shore. Such a station justifies its existence by permitting the rapid dispatch of marine fire-fighting apparatus to the scene of fires and explosions occurring both aboard ship and at docks, wharves, or marine warehouses.

The use of marine fire radio facilities has resulted in an appreciable

saving to the taxpayers. It permits continuous communication to the fire-fighting apparatus, enabling its immediate recall if the fire has been brought under control by other means, or if the alarm has subsequently been reported as false, etc. Also, a considerably smaller number of pieces of fire-fighting equipment is needed, since the same or a greater amount of protection can be assured by keeping the available units on actual fire patrol duty, rather than holding a larger number of units available at fixed locations while awaiting a call.

SPECIAL EMERGENCY STATIONS

Special emergency stations under one terminology or another have been licensed by this Government since before the establishment of the Federal Radio Commission in 1927. In December 1938 an informal engineering conference was authorized by the Federal Communications Commission, to which all parties interested were invited. The present rules governing special emergency stations are based on this conference, and on the knowledge of the problems gained from subsequent study of the uses made of radio in this connection.

Section 10.23 of these rules specifies that "Authorizations for special emergency stations will be issued only to (a) organizations established for relief purposes in emergencies and which have a disaster communication plan; (b) to persons having establishments in remote locations which cannot be reached by other means of communication; (c) to public utilities." On July 24 the Commission stressed that this type of station "may be used only during an emergency jeopardizing life, public safety, or important property" and that its employment "for the handling of routine or nonemergency communications is strictly prohibited."

When gaps occur in wire telephone or telegraph circuits caused by wind, storm, floods, or other causes, service must be restored as quickly as possible. A portable transmitter and receiver equipment has been developed which can be rushed to the scene, installed at each side of the gap, connected to the two remaining ends of the wire lines and thereby make connection between the talking or telegraph circuits through the use of radio. As soon as the wire lines have been replaced, these special emergency stations are removed and stored at strategic locations for use in the next emergency.

Stations for bridging gaps were extensively used by the telephone and telegraph companies in the New England hurricane. In many instances this was the only means of maintaining vital communications for long periods of time and until the repair crews could get through to restore the wire lines. Similar experiences occurred during the Mississippi and Ohio River floods.

In addition to the so-called disaster service, this type of station has its day-to-day use in emergencies. For example, the cable connecting Block Island with the mainland was broken through accident. One special emergency station placed on the island and another on the mainland provided telephone and telegraph service to that remote location until the cable was repaired. In another case, Tangier Island in Chesapeake Bay was cut off from the mainland by ice conditions during a severe winter storm. Special emergency stations provided the only means by which the inhabitants of the island could make known their needs for medical attention and food. As a result, supplies were flown in by air and dropped by parachutes.

5. EXPERIMENTAL SERVICES

Continued progress has been made in the perfection of transmitting and receiving equipment for operation on the ultra-high frequencies.

The ultra-high frequencies are ideally suited for certain services such as airport traffic control stations, instrument landing devices, and similar services requiring line-of-sight transmission.

In general, these frequencies are relatively free from static interference. They are not appreciably reflected from the Heaviside-Kennedy layers and hence are confined to an area extending but slightly beyond the optical path from the transmitting antenna. As a result, they cause little or no interference with distant stations. The radiation patterns are easily controlled and the physical dimensions of the antenna systems and equipment are materially reduced.

Experimental authorizations have been granted providing facilities to interested parties to investigate the possible extension of the use of the ultrahigh frequencies to existing services. The experimental reports indicate that in many cases these frequencies can furnish better service than is being obtained through the use of the conventional lower frequencies. The frequency separation band width provided in the present allocation plan permits the use of relatively wide-band frequency modulations with a correspondingly greater fidelity and static-free reception.

FREQUENCY MODULATION EXPERIMENTATION

Considerable interest has been shown in the past year in the possible extension of FM [frequency modulation] to services other than broadcast.

As explained elsewhere, frequency modulation is claimed to offer certain definite advantages over the existing AM [amplitude modulation] systems in the reduction of interference resulting from static, automobile ignition systems, and other similar sources. In addition, it appears that the geographical separation between stations can be materially reduced without serious mutual interference even though the stations are operating on the same frequency. In view of the present traffic congestion on the frequencies available for assignment, particularly with respect to services such as police, the duplication of frequencies within a relatively small area would be highly desirable.

In the police service, each system is under the direct control of one licensee who can plan and control the installation and operation of the complete communication network. The successful introduction of frequency modulation into the existing service is contingent upon the frequency band of emission required for clarity of messages and the possibility of interference to existing amplitude modulated stations. There are approximately 1,000 police radio systems with over 6,000 transmitters (including headquarters and cars) now using amplitude modulation. Before a permanent policy can be established with respect to the licensing of frequency modulation on a regular service basis, further investigations and studies will be required, both from the standpoint of the equipment requirements and the effect of simultaneous operation of amplitude and frequency modulation, on the frequencies now allocated.

In services such as the aviation service where there is intercommunications between the various licensees, a single national standard

of either amplitude or frequency modulation must obviously be adopted in the interest of safety.

In view of the numerous problems raised by the introduction of FM and the limited research that has been conducted to date, it was deemed advisable to obtain more factual data through experimental application of frequency modulation. The Commission accordingly announced on January 25, 1940, that it would accept applications for experimental authorizations permitting the use of FM in these services.

The limited number of frequencies available precludes the assignment of separate frequencies for amplitude and frequency modulation to the many types of radio services. Under the present plan, stations using frequency modulation are required to operate on the frequencies allocated to the particular service, and such authorizations are granted subject to the condition that no interference is caused to existing stations in the same service or to stations operating on adjacent channels. In view of the relatively wide frequency band required for frequency modulation in the present state of the art, it was deemed necessary to restrict such operations to frequencies above 30000 kilocycles and to require that the total band of emission plus tolerance be within the frequency separation band width as set forth in the present allocation plan.

At the end of the fiscal year nine applicants had filed for experimental authorizations to conduct a program of research and experimentation in the application of frequency modulation to services such as aeronautical, municipal and State police, and special emergency. Notable among these is the Connecticut Department of State Police. Its present plan contemplates the construction of ten 250-watt fixed police stations to be located at strategic points within that State and two hundred 25-watt mobile units. These stations when completed and in operation will provide a statewide police communication network using frequency modulation exclusively.

On the basis of the experimental reports covering the actual operation of these stations and from observations by the Commission's engineers, it is hoped that sufficient factual data can be obtained within the coming fiscal year to reach a decision as to whether and under what conditions frequency modulation can be regularly authorized for use in services other than broadcast.

RELAY OR REPEATER CIRCUITS

Another interesting development which has promise of a possible extension of the police service is the use of relay or repeater circuits.

The primary purpose of these stations is to provide facilities for relaying messages from mobile units in outlying districts back to headquarters in those cases where the intervening terrain is such as to prevent direct communications. These stations are in general located at high elevations intermediate between the mobile units and the main station and are provided with directive antennas oriented in the direction of the main station. The transmitter is operated automatically by a crystal-controlled receiver tuned to the frequency being used by the patrol cars. Messages originating at the patrol car are picked up by the receiver which automatically turns on the transmitter and relays the message to the main station. In this manner the possible service area of the system is greatly enlarged,

especially in mountainous country where the effective coverage of the police mobile transmitter is restricted to a relatively small area.

Reports reaching the Commission indicate that satisfactory service is being obtained through the use of the frequencies above 116000 kilocycles. As in the proposed use of frequency modulation, there is insufficient data available for the formulation of specific rules and regulations establishing the service on a regular basis. Until such data is obtained this class of station is granted only on an experimental basis.

RAILROAD DISPATCHING

During the year the Commission granted an experimental authorization to the General Railway Signal Co. of Proviso, Ill., for the purpose of investigating the possible application of radio to rail transportation. The proposed service provides a radio telephone communication link between the central control tower of a railway classification yard and the locomotives used in the switching operation.

The messages to be transmitted over these stations will consist of orders relative to the classifying or sorting process that is required at certain strategic points in moving freight between different sections of the country.

From information received by the Commission it appears that these classification yards form a bottleneck in the present transportation system, and a large percentage of time required for the shipment of freight is lost at that point. With the use of radio it is hoped to effect a coordinated managerial control from the central tower which should expedite the sorting processes and greatly facilitate the smooth flow of traffic through the various sections of the yard. Whether stations of this class can be authorized on a regular basis will depend on the results of experimentation.

6. ALASKAN STATIONS

The growth of Alaska is indicated by the increase in the number of its radio stations. The various types of service in Alaska for the last 2 fiscal years are shown in these figures:

Number and classes of stations

Service:	Fiscal year	
	1939	1940
Fixed public.....	300	342
Public coastal.....	150	167
Aviation.....	210	246
Special emergency.....	0	6

In general, it may be said that the operation of these stations has been satisfactory. Much obsolete equipment has been replaced and the standard of communication engineering evidenced in their operation is much higher. However, the situation with respect to the aviation service in Alaska has been considered unsatisfactory.

Air transportation in Alaska is not conducted in the same manner as elsewhere in the United States. There is a large number of independent operators who do not fly on regular schedules over fixed routes. Competition is very keen and in general there has not been cooperation in the use of available radio communication sys-

tems. This situation was deemed to be so serious that applications for renewal of all existing aeronautical and aeronautical fixed stations in Alaska and application for construction permits for new stations were designated for a hearing, which hearing was held at Fairbanks and Juneau, Alaska, beginning October 2, 1939.

Although no decision has as yet been reached as a result of the hearing, salutary effects of the Commission's action are already apparent. There was an evident misunderstanding in Alaska as to the fact of limitation in the numbers of frequencies which could be made available for aircraft communication and the resultant absolute necessity for cooperation in the use of frequencies. Since the hearing, steps have been taken in Alaska which tend to eliminate duplication of services now existing and extend service to new territories with resultant benefit both to the aircraft operator and to the public making use of air transportation.

7. MISCELLANEOUS SERVICES

The rules governing miscellaneous services comprise part 11 of the Commission's rules and regulations and govern the following services and five classes of radio stations:

- (1) Geophysical service:
 - (a) Geological stations.
- (2) Special press service:
 - (a) Relay press stations.
 - (b) Mobile press stations.
- (3) Intermittent service:
 - (a) Motion picture stations.
 - (b) Provisional stations.

Geological stations are the only ones now licensed in the geophysical service. Under this general classification there might also be included: (1) Ionosphere stations; (2) meteorological stations; (3) radio sounding stations; (4) hydrological stations; (5) oceanography stations; (6) geodesy stations; (7) seismology stations; and (8) volcanology stations. A number of these classes of stations are operated by various Federal agencies. However, there has been insufficient commercial interest for licensees under these classifications to justify their recognition on a regular basis, and to warrant the allocation of frequencies for their use. In those few cases where a need has been shown for the transient operation of stations in these categories they have been licensed on an experimental basis, using a frequency allocated to experiment stations. No such licenses are now outstanding. There are, however, 304 geological stations now licensed, and reports indicate that the needs of national defense have resulted in great activity on the part of these stations in the detection of probable localities where oil may be obtained if and when present operating oil fields show signs of depletion.

Special press service embraces two classes of stations—relay and mobile. Three mobile press stations now provide a radiotelegraph press service to maritime mobile stations. There are seven relay press stations, which is a new classification established by the preceding fiscal year and first reported in the last annual report. The number of relay press stations now existing is too few, and their use has been too limited to justify a report as to the economic benefits gained by the public from their use.

Intermittent service designates motion picture stations and provisional stations. There are 12 stations now licensed under the former classification and, as has been previously reported, their use has contributed to the production of many excellent motion pictures.

At the present time there are only three systems operating under the classification of provisional station. This type of station was established to provide a classification in which could be placed those communications needed for a temporary period pending completion of a specific project.

In connection with the erection of a bridge across Lake Washington, King County, Wash., one fixed station and seven associated portable and mobile stations are in use. The construction of a bridge at the Narrows, Pierce County, Wash., is facilitated by the use of one fixed station at Tacoma with five portable mobile stations. The latest system authorized is in connection with the construction of the Shasta Dam, Shasta County, Calif., for which purpose one fixed station and three portable mobile stations have been authorized.

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CHAPTER VIII

Operators

1. COMMERCIAL RADIO OPERATORS
2. AMATEUR RADIO OPERATORS
3. TELEGRAPH AND CABLE OPERATORS

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CHAPTER VIII—OPERATORS

I. COMMERCIAL RADIO OPERATORS

The licensing of radio operators is a function performed by the Commission under the provisions of section 303 of the Communications Act. Among other things, this section confers upon the Commission authority to prescribe the qualifications of station operators, to classify them according to the duties to be performed, to fix the form of such licenses, and to issue them to such citizens of the United States as the Commission finds qualified.

On July 1, 1939, revised rules governing commercial radio operators were made effective by the Commission. The most important change was the establishment of a new procedure respecting the examining of radio operators. For administrative convenience, the examinations have been divided into six elements. Any class of operator license may be obtained by combining one or more elements as may be required for the class of license applied for. Credit is allowed for elements represented by the class of license which an operator holds so that only the additional elements need be completed to obtain a higher class of license.

REVISED EXAMINATIONS

During the past year revised examinations were adopted. The majority of questions are of the multiple-answer type, which have the advantage of permitting a greater number of questions to be answered in a specified time, thus making feasible examinations of wider scope to better sample the applicant's knowledge. Also important is the type of answer required which promotes accuracy in grading and requires less of an inspector's time.

To apprise applicants of the scope of the new examinations, the Commission has prepared and made available for sale by the Superintendent of Documents a publication entitled "Study Guide and Reference Material for Commercial Radio Operator Examinations." This publication contains more than 1,300 questions covering the scope of the examinations for all classes of commercial operator licenses. In addition to questions, there have been included, for ready reference, extracts from the Communications Act, the General Radio Regulations, and excerpts from rules and regulations of the Commission.

NATIONAL DEFENSE PRECAUTIONS

In view of the prevailing international situation, the Commission considered it necessary to caution ship radio operators and ship station licensees that both the General Radio Regulations (Cairo revision, 1938) annexed to the International Telecommunications Convention (Madrid, 1932), to which this Government is a party, and the Communications Act of 1934 specifically prohibit the transmission of superfluous, unnecessary, or unidentified communications. Both

the International Regulations and the Communications Act place the radio service of a ship station under control and authority of the master of the ship. The Commission stated its intention to enforce vigorously these provisions of law and treaty and will hold ship station licensees, masters of ships, and radio operators on board fully responsible for any violations.

Acting in the interest of national defense, the Commission on June 18, 1940, promulgated order No. 75, requiring all persons holding any class of radio operator's license and all persons subsequently applying for an operator's license to exhibit proof of their United States citizenship. All licensed radio operators were to file with the Commission under oath the response on Form 735 not later than October 15, 1940. In addition to the questionnaire, every person affected by the order was to file a copy of his fingerprints, photograph, and birth certificate, or other data tending to establish citizenship.

2. AMATEUR RADIO OPERATORS

The increase in the number of amateur stations licensed by the Commission during the past year is an indication of the continued widespread interest in the amateur service. There were approximately 56,300 licensed amateur stations on June 30, 1940, as compared with 53,000 such stations at the close of the previous fiscal year.

TECHNICAL DEVELOPMENTS

Continuing the Commission's policy to encourage technical developments and operating proficiency in the amateur service, a number of regulations were revised with the view of broadening their activities and extending experimentation into new fields. The adoption of regulations authorizing radiotelephone frequency modulation in the 58500 to 60000 kilocycles portion of the 56000 to 60000 kilocycles amateur frequency band was probably the most important change, thus making available to amateurs a frequency band possessing characteristics most suitable for experimentation directed toward elimination of objectionable interference originating from operation of various electrical devices or natural atmospheric electrical discharges. Occasion was also taken to modify a number of rules in the interest of clarity.

The majority of amateur stations employ radiotelegraph using the International Morse Code as the means of communication between stations; others use radiotelephony. However, renewed interest in communicating by International Morse Code was noted during the year, there being many amateur stations transmitting code instructions that amateurs may increase proficiency thereby. Likewise, members of organizations affiliated with the Army and Navy engage in drills in radiotelegraphy and yearly events are arranged in which a large number of amateurs participate in copying transmissions prepared to test their skill in the International Morse Code.

Other groups of amateurs have established networks for operation in times of a communication emergency and have performed valuable service during the past year in many sections of the country by establishing communication facilities in areas visited by storms, floods, and other catastrophes when normal communication channels were disrupted. Amateurs also assisted a number of scientific expeditions by furnishing communication facilities for the exchange of scientific information between the expeditions and their sponsors.

REVISED EXAMINATIONS

In order that the examinations for amateur radio operator licenses keep pace with the progress made in technical developments and changes in law, treaty, and regulation, the amateur examinations were revised during the year. Questions of the multiple-answer type have been adopted, since experience with this type of question in the commercial operator examinations has proved highly satisfactory. In connection with the new examinations, a booklet entitled "Study Guide and Reference Material for Amateur Radio Operator License Examination" has been made available upon application to the Commission. This publication contains extracts from law, treaty, and regulations pertinent to the amateur service, as well as a list of questions of the essay type which cover the scope of the examinations but are so paraphrased as to give no indication of the actual examination questions.

NATIONAL DEFENSE SAFEGUARDS

As a result of the international situation, the Commission promulgated a number of orders affecting the amateur service. The frequencies allocated to amateur stations and the type of equipment used make possible the establishment of international communications and international interception of domestic communications. With the large number of amateurs it is very difficult to monitor this service to guard against deliberate or unintentional breaches of neutrality. For this reason the Commission on June 4, 1940, issued Order 72, prohibiting the exchange of communications with radio operators or radio stations of any foreign government or located in any foreign country. However, provision was made to permit communication between licensed amateur operators and licensed amateur stations in the United States and its possessions, and between licensed amateur operators and licensed amateur stations in the continental United States and United States citizens authorized to operate amateur radio stations in the Philippine Islands or the Canal Zone, and between licensed amateur operators and licensed amateur stations in the several Territories and possessions of the United States.

Following this, Order 73, issued on June 7, 1940, prohibited operation of portable and portable-mobile radio stations pending further order of the Commission. However, an exception provided that licensed portable and portable-mobile amateur stations may operate on frequencies above 56000 kilocycles at locations within the United States and its possessions. Also, the order was held not to apply to licensed amateur portable and portable-mobile stations participating in the field day tests sponsored by the American Radio Relay League held June 22 and 23, 1940.

Order 73-A, effective June 7, 1940, provided that Order No. 73 shall not apply to the operation of licensed portable and portable-mobile amateur stations actually engaged in supplying or attempting to supply domestic communication in the public interest during a bona fide communications emergency when normal facilities are inadequate or nonexistent, or when actually engaged in the domestic testing and developing of self-powered portable and portable-mobile equipment intended for use in domestic communications emergencies, during the hours between sunrise and sunset on Saturdays and Sundays, provided notice of such testing and developing operation shall have been given

at least 48 hours in advance to the Commission inspector in charge of the district in which such operation is contemplated. Order 72-A, issued June 29, 1940, amended Order 72 to the extent of authorizing amateur Station W2USA, located at the New York World's Fair, to communicate with ship Station WHFZ on Board the *Effie M. Morrissey*, which was on an expedition, and desired amateur communication facilities for the protection of life and property.

By Order 75 the Commission required that each radio operator who holds an outstanding commercial or amateur radio operator license file with the Commission his response under oath to questionnaire Form No. 735, which concerns the citizenship of the licensee, his family and past history. Also, fingerprints were to be furnished, as well as a passport-size photograph of the licensee. This was to have been done not later than October 15, 1940.

3. TELEGRAPH AND CABLE OPERATORS

CITIZENSHIP PROOF OF EMPLOYEES HANDLING INTERNATIONAL COMMUNICATIONS

In order to establish the citizenship status of employees of cable and telegraph companies handling international communications, the Federal Communications Commission on August 21, 1940, announced that it was enlisting the cooperation of such companies in having these workers fill out a jointly compiled questionnaire and furnish photographs and fingerprint records. This information is akin to that required of commercial and amateur radio operators in connection with the coordinated national defense program.

Proof of citizenship and accompanying identification are not desired of all communication company employees, but only of those who, in the course of their duties, handle international messages or have access to information passing over international circuits. The need for such data was mutually agreed in conferences between representatives of the companies and the Commission.

As a result of consultation with these companies, special forms were worked out for the purpose—FCC Form No. 737, Questionnaire for Employees of Communications Companies, and fingerprint and photograph record on FCC Form 738.

These forms are supplied in number to each company to take care of the necessary personnel. The companies indicated that they would assist their respective employees to execute the forms with the least possible inconvenience. In certain cases the Commission offered to send field men to offer facilities and other aid.

As in the case of commercial and amateur radio operators, forms were to be mailed to the Commission's Washington offices for permanent record. However, in the case of communication company employees the supervision of filling out the forms and mailing them to the Commission was to be under company direction, without direct contact between the individual employee and the Commission.

This extension of proof-of-citizenship requirement is necessary for effective policing of communications in the present emergency.

CHAPTER IX

Licensing

[OTHER THAN BROADCAST]

1. COMMON CARRIERS
2. RADIOTELEGRAPH LICENSES
3. RADIOTELEPHONE LICENSES
4. COMMERCIAL OPERATOR LICENSES
5. AMATEUR OPERATOR LICENSES
6. UNLICENSED OPERATION

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CHAPTER IX—LICENSING

1. COMMON CARRIERS

Licensees in the fixed public radiotelephone and radiotelegraph services (except Alaska) are engaged as common carriers of radio communications offering a world-wide international service and a limited domestic radiotelegraph service. The Commission has the duty, in addition to the licensing function, of regulating their rates, practices, classifications of services and tariffs, and supervision of accounts. The matter of regulation having been dealt with in previous chapters, the following discussion is limited to the licensing phase. The Commission exacts no charge of any kind for licensing operators or stations.

The radiotelegraph service as operated under our system is highly competitive, yet is necessarily limited by its state of development and by economic demands. The Commission must have before it full information and facts prior to determination upon any application. Many applications, other than those involving minor changes in equipment and renewal licenses of existing stations, can be finally acted upon only after extensive hearings.

LICENSING PROCEDURE MODERNIZED

The Commission in October 1939 further revised its rules governing radio common carriers in order to modernize its licensing procedure and relieve the carriers from an unnecessary burden in accommodating their operating practices with seasonal needs and changes. Heretofore a separate license was issued for each frequency used in the international service. While this license specified definite points of communication and transmitter, licensees were permitted under an alternative clause contained in the license for flexibility of operation to communicate with any point contained in a license granted by the Commission or to use any transmitter of the same type and description. This method of licensing led to a large number of routine modification of licenses to accommodate seasonal changes and operating practices. Consequently, the Commission adopted new rules providing that all the facilities at any given transmitter location be licensed by a single document. Under this provision a licensee may use any frequency or transmitter to any point of communication so long as the maximum power specified for the individual frequency is not exceeded. This reduced the number of licenses issued from 435 to 87 and eliminated an unnecessary burden of modification of many of the licenses during the year.

TRAFFIC STUDIES

Shortly after commencement of the fiscal year it was recommended that activities in the fixed public radio services be expanded so that extremely important work could be accomplished and adequate rec-

ords maintained. It was proposed that studies and records show the flow of traffic to all parts of the world, the routing of traffic, extensions of existing radio circuits, actual use made of frequencies by licensees, and other pertinent data which would not only be available for use by the Commission but by other Government departments as well. In the light of recent world developments such studies and information have become exceedingly important. Certain information was obtained by the Commission for a typical day. However, with conditions changing so rapidly, these records must be maintained continuously in order to be of practical value.

CIRCUITS DISRUPTED BY WAR

The existing war in Europe has had a marked effect upon communications facilities to and from that continent, both as to the direct facilities available and as to the content of the message which is dependent upon the restrictions placed by the administration or agency operating the foreign end of the circuit. Many direct circuits formerly operated from this country have been disrupted. This has necessitated the rerouting of traffic via devious routes and additional restrictions. Although some of circuits have been reestablished, many circuits heretofore operated are nonexistent. The Commission has acted promptly in granting special temporary authority for the establishment of circuits to new or temporary points in order that important Government, diplomatic, and commercial messages may be efficiently and expeditiously handled.

2. RADIOTELEGRAPH LICENSES

As of June 30, 1940, there were 16 radiotelegraph common carriers operating transmitting equipment at 71 stations and approximately an equal number of receiving stations for the reception of incoming traffic. The majority of these companies operate principally in the international field, although there is a limited domestic service between 11 cities of the United States, between certain points on the Great Lakes serving the maritime interests, between isolated cities in the southwest oil fields, and interisland service in Hawaii and Puerto Rico. The companies operating in the international field offer a comprehensive service direct to 64 foreign points and indirect service to practically any country.

The radiotelegraph companies may transmit only public correspondence pursuant to tariffs on file with the Commission, and service messages incidental to and necessary for the expeditious movement of traffic. In addition to the regular classifications of telegraph messages handled in accordance with established tariffs, these companies handle other types of traffic, such as addressed program material to and from overseas points for rebroadcast to the listening public, facsimile and radiophotographs, and multiple point press service for reception principally by newspapers and broadcast stations. The latter service is widely used in the United States, thereby providing broadcast stations with the latest press bulletins available.

WAR CONDITIONS

Most of the changes due to conditions in Europe occurred either during the latter part of the summer of 1939 or in the early spring of

1940. Circuits to the following countries were at one time or another disrupted and direct service suspended: Poland, Czechoslovakia, Norway, Denmark, Belgium, Holland, Iceland, and France. However, direct circuits to Denmark and France were reestablished during the year and indirect service to portions of the other countries has been available from time to time under certain restrictions.

In addition to the normal channels of communication, the Commission authorized special temporary authority on various occasions to provide adequate facilities to keep abreast of developments. In the main, such authority consisted of control circuits to Italy, Belgium, Holland, and Germany to regulate the heavy flow of incoming press dispatches, direct circuits to Eire, Italy, and Greenland, and direct circuits to various points in France during the invasion of that country and the disruption of the facilities normally operated from Paris.

"INACTIVE POINT" AND ROME-WARSZAW CASES

During the year the Commission disposed of several docket cases affecting radiotelegraph common carriers which had been pending for a number of years. These actions determined the many so-called "Inactive point" cases and Rome-Warsaw case.

In the "Inactive point" cases the Commission issued "show cause" orders on all licenses authorized to communicate with designated foreign points but to which no circuits were actively operated. Most of these points were voluntarily relinquished and new licenses issued. However, the R. C. A. Communications, Inc., requested a hearing with respect to the deletion of Sydney and Melbourne, and the Mackay Radio & Telegraph Co. (Delaware) with respect to the deletion of Madrid, Paris, and Berlin. As a result of the hearing, the Commission determined that the licensees should be permitted to retain these points for the period ending December 1, 1941, under certain specified limitations.

The applications of the Mackay Radio & Telegraph Co. (Delaware) to communicate with Rome and Warsaw were denied in March 1940. In the case of Rome, the Commission found, among other things, that there were ample communication facilities serving that area, that traffic would be diverted from existing carriers, and that the applicant did not propose either new or improved service or at reduced rates. However, upon the entrance of Italy into the war and the disruption of the Italy cable, the Commission granted special temporary authority to operate a direct radiotelegraph circuit to Rome. In the case of Warsaw, the issues upon which the application was heard no longer existed due to the invasion of Poland.

GLOBE WIRELESS SERVICE

As a result of the filing of tariffs for a limited domestic service by Globe Wireless, Ltd., which had previously been engaged principally in trans-Pacific operations, the Commission in January 1940 issued a "show cause" order which would limit the use of frequencies assigned to that company to the handling of trans-Pacific traffic only upon the grounds that domestic points were adequately served by existing companies; that this company had always taken the position that its frequency assignments were insufficient to handle both trans-Pacific and domestic traffic; that additional frequencies had been

requested and authorized on such basis, etc. Globe Wireless, Ltd., requested a hearing, which commenced on April 17, 1940. In May 1940 the respondent filed a petition for final disposition which assented to the limitation that its frequencies would not be used for the handling of traffic originating in and destined to points within the 48 States and the District of Columbia. The Commission granted the petition and inserted such limitation in each of the licenses of the respondent.

NEW FREQUENCIES AND STATIONS

In the course of the last year several new frequencies were authorized to meet the needs of the various companies in the expeditious handling of traffic. Most of these assignments were the result of increased activity due to the war by countries having priority of registration. While no new companies were licensed to engage in radiotelegraph communications for hire, the Commission authorized the construction of two transmitting stations at two new locations. Globe Wireless, Ltd., built a new station at Portland, Oreg., for radiotelegraph traffic, and Press Wireless, Inc., constructed a station in the vicinity of Los Angeles for press and facsimile traffic originating principally from activities in Hollywood and destined to Honolulu, Tokyo, and European points. Both of these stations are, however, limited to transoceanic traffic.

In addition to this expansion of new stations, the Commission granted the application of R. C. A. Communications, Inc., to add Quito, Ecuador, as a point of communication. This had been pending from the previous year as a result of a hearing and the application of Globe Wireless, Ltd., to add the point of Havana. In the latter case the Commission granted the application without hearing. Existing companies serving that point did not file objection or request hearing.

3. RADIOTELEPHONE LICENSES

WAR CONDITIONS

As in the case of the radiotelegraph services, war conditions in Europe have had their effect upon the growth of the transatlantic telephone traffic due to the restrictions placed upon calls and the disruption of direct circuits. However, the total number of messages handled during the calendar year of 1939 was 51,762, as compared with 51,389 for the previous year.

Just after the outbreak of the war in September 1939, the direct circuit to Rome was established and telephone messages to that country, Germany, and hinterland countries were so routed. In addition, the Commission granted special temporary authority to establish a new direct circuit to Amsterdam in order to serve Belgium, Denmark, and the Scandinavian countries. In May 1940 the direct circuits to Berlin and Berne commenced operation on a commercial basis, while the direct circuits to Amsterdam and Paris were disrupted by the invasion. To date circuits to these countries have not been reestablished.

NEW CIRCUITS

Since it had become necessary, due to the importance of Government and diplomatic messages, to maintain direct circuits to each

country on a 24-hour basis, the Commission granted additional frequencies for another circuit to Europe, even though all circuits are not continually handling message traffic. The increase in traffic loads to Buenos Aires and San Juan as a result of economic and trade activities necessitated the establishment of exclusive circuits rather than forked circuits as heretofore operated and the assignment of additional frequencies to accomplish this purpose. It is anticipated that traffic to Central and South America will materially increase during the coming year.

GENERAL SERVICE

Radiotelephone service from the United States is rendered to practically all points in the world through facilities of the American Telephone & Telegraph Co. located at three primary distribution centers, namely, New York, Miami, and San Francisco. Telephone service to points in Europe, Africa, South America (except Venezuela and Colombia), and the Near East is handled via New York, while that for Asia and Oceania is routed through San Francisco. Messages destined for Central America and northern South America are transmitted from Miami.

In Puerto Rico service is rendered by the Radio Corporation of Porto Rico at San Juan, and in Hawaii by the joint facilities of the Mutual Telephone Co. and the R. C. A. Communications, Inc.

4. COMMERCIAL OPERATOR LICENSES

World events during the fiscal year aroused interest in radio operators as well as radio operation. Government agencies and commercial interests sought information as to number and qualification of operators, particularly in those classes who would be available in a national emergency to maintain vital channels of communication and man essential new ones.

The Commission continued to license commercial operators in two main groups—radiotelegraph and radiotelephone—dividing each group into three classes. Many individuals qualified for a class in each group. Actual licensing has been decentralized among 27 widely separated field offices of the Commission. Approximately 40,000 commercial-operator applications were handled during the year and relayed to a central file.

This record reflected the increasing demands on radio in old and new fields, such as the particularly rapid growth of two-way radio for police purposes. Thus, the number of individuals who had obtained only the lowest radiotelephone class of license was rapidly approaching 50,000. Most of these were police officers, but included were many aviators, owners of small boats, and others. The holders of higher radiotelephone classes, required at broadcast transmitters, substantially exceeded 10,000. Substantially less than that number, including several thousand of the same persons, were holders of radiotelegraph licenses usable at sea or at land radiotelegraph stations.

The ages of these licensed commercial operators vary, but a substantial number are in their twenties and thirties. Less than 10 percent are below the age of 21. A fourth of all were minors when first licensed, but this was not true of the recent new applicants, nearly 90 percent of whom had attained majority before applying. While related figures differ with classes and groups, the foregoing

statements apply to radiotelegraph or radiotelephone operators generally.

Regulations contained but one age restriction, rendering a minor ineligible to radiotelegraph operator first class. This was one of numerous additions and changes in the Commission's regulations governing radio operator licenses at the beginning of the fiscal year. At the same time the license examinations were revised in scope and character, fixing standards in code tests and in the main converting written tests to a multiple-choice form that proved very satisfactory.

Toward the end of the fiscal year the Commission adopted its Order 75, calling for more information regarding each licensed operator, including a more complete showing than heretofore of the basis of his United States citizenship, required by law for eligibility for such a license.¹ The first effect of the order was the surrender and cancelation of a number of licenses. [See more detailed discussion of commercial operators in previous chapter.]

5. AMATEUR OPERATOR LICENSES

All amateur operators were likewise called upon for citizenship proof by the Commission's Order 75, and a number preferred to surrender their amateur privileges.

Of a total approximating 55,000 licensed amateur operators at the close of the year, half held class B, more than a third held class A, and less than a sixth held class C privileges. Class B is basic. Class A allows wider choice of frequency for radiotelephone, while class C indicates qualification through nonassembled examination. The latter card is issued subject to call at any time for class B qualification or forfeiture. Applicable regulation renders such a call automatic if a class C holder moves within 125 miles of any point where the class B examination could be taken as often as quarterly, with some exceptions for physical disability or service connections.

More than a thousand examinations a month were given to applicants for amateur license or change of license, including an increasing number of class C holders due to the regulation above mentioned. During the year the Commission took a number of actions affecting its regulations governing amateur operators and their stations. [See previous chapter for more information about this type of radio operation.]

AMATEUR STATION LICENSES

The Commission's Order 72 of June 4, 1940, suspended communication between United States amateur stations and those in foreign countries. Its Order 73 of June 7 suspended operation of portable and portable-mobile amateur stations on frequencies below 56 megacycles. The response of licensed amateurs, not only in immediate compliance with these orders but in expressing their understanding of such precaution during the existing conditions, was highly gratifying.

Amateurs continued their experiments and intercommunication between their home stations throughout the States, Territories, and possessions, for which upwards of 56,000 amateur station licenses were outstanding on June 30. Amendment of regulations earlier in the fiscal year facilitated their experiments with frequency modulation and

¹ Communications Act, sec. 303 (1).

removed a prohibition against an unmodulated carrier on the short range frequencies assigned for their use above 60 megacycles.

The amateurs continued to offer their facilities for use in emergencies and otherwise volunteered their services without compensation, and applications for amateur licenses continued in substantial number. There were received during the year nearly 38,000 applications for amateur operator and station licenses, and nearly 50,000 amateur licenses (operator or station) were issued or reissued in that period.

6. UNLICENSED OPERATION

Many cases of alleged unlicensed operation of radio stations were investigated during the year. Because of the desirability of affirmatively proving the interstate characteristics of the transmissions, investigation of these cases frequently presents a most difficult problem. There were 25 cases, however, in which proof was satisfactory and in which other circumstances warranted reference to the Department of Justice. Of these, a conviction or plea of guilty was obtained in 7 cases, 4 persons have been indicted but not sentenced, 10 cases are pending, 1 proceeding was dismissed by the Commission, no true bill was returned in another, and the United States attorneys did not prosecute in 2 instances.

In addition to prosecutions by the Department of Justice, the Commission has revoked the licenses of 3 amateur stations and has suspended the licenses of 13 operators.

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CHAPTER X

Statistics

1. STATISTICAL COMPILATIONS
2. STATISTICS ON BROADCAST LICENSING
3. STATISTICS ON COMMERCIAL LICENSING
4. STATISTICS ON AMATEUR LICENSING
5. STATISTICS ON FIELD ACTIVITIES
6. ACTIONS ON BROADCAST REHEARING PETITIONS
7. ACTIONS ON COMMON CARRIER REHEARING PETITIONS
8. APPROVED TYPES OF MARINE RADIO EQUIPMENT
9. PUBLICATIONS

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CHAPTER X—STATISTICS

1. STATISTICAL COMPILATIONS

Section 219 of the Communications Act authorizes the Commission to require annual reports containing financial and operating data from all carriers subject to its authority, and from persons controlling or controlled by any such carrier. In addition, the Commission may require communication carriers to file monthly reports of earnings and expenses, and periodic or special reports concerning any matters under Commission jurisdiction. Various other provisions of the statute, such as contained in sections 215 and 218, make necessary the gathering of factual data of financial and statistical nature by the Commission.

Radio broadcasters are not deemed common carriers but the Commission requires annual, periodic, and special reports from such persons under authority of the provisions contained in title III of the act.

Report forms are prescribed by the Commission on which specific answers to all questions are required. From these reports, financial and operating data are tabulated for annual, monthly, or selected periods. Economic and statistical research is made on problems in the regulation of communication carriers. Review and analysis of statistical methods and forms is made with a view to their improvement to meet present-day statistical needs and requirements.

General summaries of statistical data received from reporting companies are prepared for analysis and use by the Commission. Included are annual and monthly summaries of financial and operating data of telephone, telegraph, cable, and radiotelegraph carriers; annual and special summaries of information on the broadcast industry; and miscellaneous summaries, such as intercorporate relations of communication carriers and their controlling companies, and statistics of international telegraph traffic reported by United States carriers.

Much of the Commission's statistical material, including figures, charts, and tables heretofore appended to the annual report, will be found in the "Statistics of the Communications Industry of the United States" now published separately and sold by the Superintendent of Documents.

These statistics are useful to other governmental agencies, educational institutions, research groups, and by firms and individuals interested in details of the communications industries. A public reference room is maintained at the Commission's offices in Washington where the public can examine the reports and other records of the communication carriers.

2. STATISTICS ON BROADCAST LICENSING

Number of stations in all classes of broadcast service for fiscal year ending June 30, 1940

Class of station	As of 7-1-39	New	Deleted	As of 7-1-40
Standard broadcast.....	774	79	10	1 847
Special broadcast.....	4	0	0	1 0
High-frequency broadcast.....	46	16	12	50
Low-frequency relay.....	199	40	14	225
High-frequency relay.....	275	46	43	278
Developmental.....	12	1	6	7
Television.....	23	7	4	26
International.....	14	0	1	13
Facsimile.....	12	5	1	16
Noncommercial educational.....	2	1	0	3
Total.....	1,361	195	91	1,465

¹ Special broadcast stations were reclassified as standard broadcast stations.

Applications received for all classes of broadcast stations for fiscal year ending June 30, 1940

Applications for new stations:

Broadcast.....	312
Relay broadcast.....	81
International broadcast.....	3
Television broadcast.....	59
Facsimile broadcast.....	5
High-frequency broadcast.....	240
Noncommercial educational broadcast.....	9
Developmental broadcast.....	7
Total.....	716

Applications for construction permits:

Broadcast.....	452
Relay broadcast.....	51
International broadcast.....	11
Television broadcast.....	9
Facsimile broadcast.....	0
High-frequency broadcast.....	18
Noncommercial educational broadcast.....	0
Developmental broadcast.....	1
Total.....	542

Applications for modification of construction permits:

Broadcast.....	246
Relay broadcast.....	20
International broadcast.....	1
Television broadcast.....	3
Facsimile broadcast.....	4
High-frequency broadcast.....	17
Noncommercial educational broadcast.....	0
Developmental broadcast.....	3
Total.....	294

Applications for modification of licenses:

Broadcast.....	394
Relay broadcast.....	47
International broadcast.....	16
Television broadcast.....	25
Facsimile broadcast.....	4
High-frequency broadcast.....	7
Noncommercial educational broadcast.....	0
Developmental broadcast.....	0
Total.....	493

Application for licenses:	
Broadcast	249
Relay broadcast	151
International broadcast	3
Television broadcast	6
Facsimile broadcast	4
High-frequency broadcast	27
Noncommercial educational broadcast	0
Developmental broadcast	4
Total	444
Applications for assignment of licenses:	
Broadcast	44
Relay broadcast	13
International broadcast	0
Television broadcast	0
Facsimile broadcast	1
High-frequency broadcast	1
Noncommercial educational broadcast	0
Developmental broadcast	0
Total	59
Applications for assignment of construction permits:	
Broadcast	4
Relay broadcast	1
International broadcast	0
Television broadcast	0
Facsimile broadcast	0
High-frequency broadcast	0
Noncommercial educational broadcast	0
Developmental broadcast	0
Total	5
Applications for transfer of control of corporations:	
Broadcast	44
Relay broadcast	1
International broadcast	0
Television broadcast	0
Facsimile broadcast	0
High-frequency broadcast	0
Noncommercial educational broadcast	0
Developmental broadcast	0
Total	45
Applications for transmission of foreign programs:	
Broadcast	12
Total	12
Applications for special experimental authorizations:	
Broadcast	59
Relay broadcast	0
International broadcast	1
Television broadcast	0
Facsimile broadcast	0
High-frequency broadcast	0
Noncommercial educational broadcast	0
Developmental broadcast	0
Total	60
Applications to install automatic frequency control equipment:	
Broadcast	16
Total	16
Applications to determine operating power by direct measurement:	
Broadcast	289
Total	289
Total	2,975

Applications for renewal of licenses:

Broadcast	1,947
Relay broadcast	495
International broadcast	14
Television broadcast	18
Facsimile broadcast	12
High-frequency broadcast	41
Noncommercial educational broadcast	2
Developmental broadcast	6

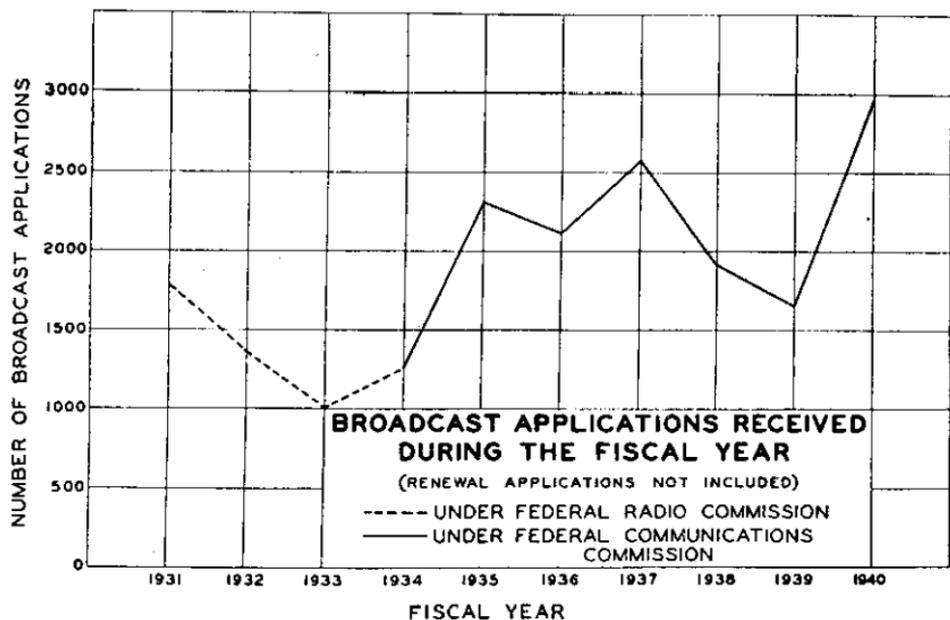
Total 2,535

Informals:

Broadcast	1,303
Relay broadcast	123
International broadcast	16
Television broadcast	36
Facsimile broadcast	11
High-frequency broadcast	59
Noncommercial educational broadcast	0
Developmental broadcast	3

Total 1,551

Grand total 7,061



Authorizations issued for all classes of broadcast stations for fiscal year ending June 30, 1940

Formal:

Broadcast	1,553
Relay broadcast	630
International broadcast	32
Television broadcast	19
Facsimile broadcast	32
High-frequency broadcast	105
Noncommercial educational broadcast	3
Developmental broadcast	16

Total 2,390

Renewals:

Broadcast.....	2,400
Relay broadcast.....	436
International broadcast.....	15
Television broadcast.....	41
Facsimile broadcast.....	17
High-frequency broadcast.....	65
Noncommercial educational broadcast.....	2
Developmental broadcast.....	6

Total..... 2,982

Special authorizations:

Broadcast.....	789
Relay broadcast.....	121
International broadcast.....	15
Television broadcast.....	29
Facsimile broadcast.....	11
High-frequency broadcast.....	43
Noncommercial educational broadcast.....	0
Developmental broadcast.....	4

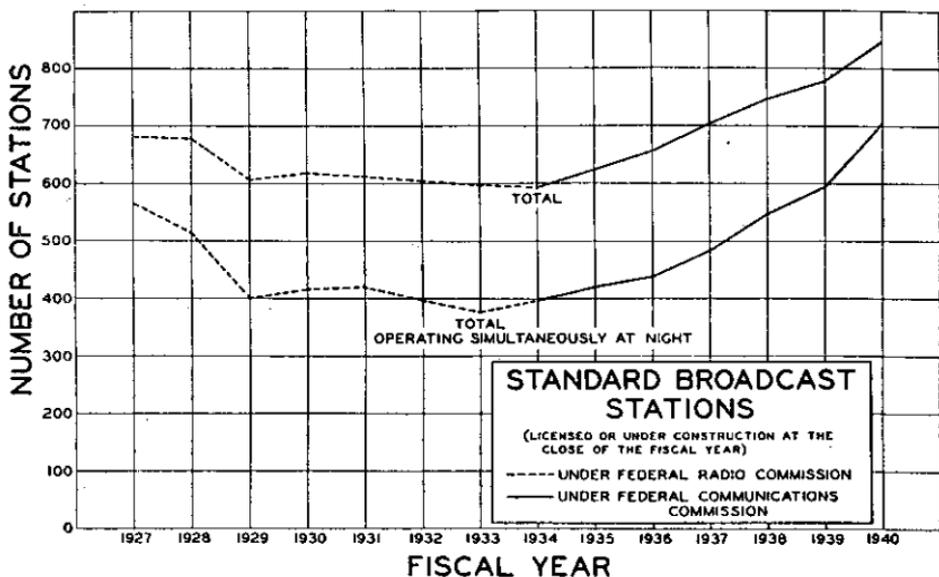
Total..... 1,012

Informal:

Broadcast.....	310
Relay broadcast.....	5
International broadcast.....	0
Television broadcast.....	0
Facsimile broadcast.....	1
High-frequency broadcast.....	3
Noncommercial educational broadcast.....	0
Developmental broadcast.....	0

Total..... 319

Grand total..... 6,703



New standard broadcast stations authorized for fiscal year ending June 30, 1940

Call letters	Applicant and location	Power	Fre- quency	Hours of operation
		Watts 250-LS	Kilocycles	
KENO	Geo. Penn Foster, Maxwell Kelch, and Calvert Chas. Applegate, doing business as Nevada Broadcasting Co., Las Vegas, Nev.	100 250-LS	1370	Unlimited.
KFUN	Las Vegas Broadcasting Co., Inc., Las Vegas, Nev.	100 250-LS	1420	Do.
KHAS	The Nebraska Broadcasting Co., Hastings, Nebr.	100 250-LS	1200	Do.
KMYC	Marysville Yuba City Broadcasters, Inc., S. E. of Marysville, Calif.	100	1420	Do.
KMYR	F. W. Meyer, Denver, Colo.	100 250-LS	1310	Do.
KODL	Western Radio Corp., The Dalles, Oreg.	100 250-LS	1200	Do.
KONB	MSB Broadcasting Co., Omaha, Nebr.	250	1500	Do.
KORN	Nebraska Broadcasting Corp., Fremont, Nebr.	100 250-LS	1370	Do.
KPHO	M. C. Reese, Phoenix, Ariz.	100 250-LS	1200	Do.
KUIN	Southern Oregon Broadcasting Co., Grants Pass, Oreg.	100	1310	Do.
KVFD	Northwest Broadcasting Co., Ft. Dodge, Iowa	100 250-LS	1370	Specified hours.
KVIC	Radio Enterprises, Inc., N. of Victoria, Tex.	100 250-LS	1310	Unlimited.
KWAT	Midland National Life Insurance Co., Watertown, S. Dak.	250	1210	Do.
KWBD	W. B. Dennis, Plainview, Tex.	100	1200	Daytime.
KWFC	Clyde E. Wilson and Howard A. Shuman, doing business as Hot Springs Broadcasting Co., Hot Springs, Ark.	100 250-LS	1310	Unlimited.
KWLM	Lakeland Broadcasting Co., Willmar, Minn.	100	1310	Do.
KYAN	J. Cecil Bott, Matilda Lannen, and Nettie Bott, doing business as The Western Broadcasting Co. of Wyoming, Cheyenne, Wyo.	250	1370	Do.
KYUM	Yuma Broadcasting Co., Yuma, Ariz.	100 250-LS	1210	Do.
WAJR	West Virginia Radio Corp., Morgantown, W. Va.	250	1200	Do.
WAKR	Summit Radio Corp., Akron, Ohio	1,000	1530	Do.
WAOV	Vincennes Newspapers, Inc., Vincennes, Ind.	100	1420	Do.
WARM	Union Broadcasting Co., Scranton, Pa.	100 250-LS	1370	Do.
WATW	WJMS, Inc., Ashland, Wis.	100	1370	Do.
WBML	Middle Georgia Broadcasting Co., Macon, Ga.	250	1420	Do.
WBOC	The Peninsula Broadcasting Co., Salisbury, Md.	250	1500	Do.
WBRW	McDowell Service Co., Welch, W. Va.	250	1310	Do.
WCAR	Pontiac Broadcasting Co., Pontiac, Mich.	1000	1100	Daytime.
WCBI	Birney Imes, Columbus, Miss.	250	1370	Unlimited.
WCBT	J. Winfield Crew, Jr., Roanoke Rapids, N. C.	250	1200	Do.
WCED	Tri-County Broadcasting Co., Du Bois, Pa.	250	1200	Do.
WDAK	L. J. Duncan, Leila A. Duncan, Josephine A. Keith, Effie H. Allen, and Aubrey, Gay, doing business as Valley Broadcasting Co., West Point, Ga.	250	1310	Do.
WERC	Presque Isle Broadcasting Co., Erie, Pa.	100 250-LS	1500	Do.
WESX	North Shore Broadcasting Co., Salem, Mass.	100	1200	Do.
WFCI	Pawtucket Broadcasting Co., Pawtucket, R. I.	1000	1390	Do.
WFHR	Wm. F. Huffman, Wisconsin Rapids, Wis.	100 250-LS	1310	Do.
WFIG	J. Samuel Brody, Sumter, S. C.	100 250-LS	1310	Do.
WFPG	Neptune Broadcasting Corp., Atlantic City, N. J.	100 250-LS	1420	Do.
WFTL	Tom M. Bryan, Ft. Lauderdale, Fla.	100 250-LS	1370	Do.
WFTM	Fort Myers Broadcasting Co., Fort Myers, Fla.	100 250-LS	1210	Do.
WGGA	Henry Estes, Austin Dean, and L. H. Christian, doing business as Gainesville Broadcasters, Gainesville, Ga.	250	1210	Do.
WGOV	E. D. Rivers, Valdosta, Ga.	100 250-LS	1420	Do.

Call letters	Applicant and location	Power	Fre- quency	Hours of operation
		<i>Watts</i>	<i>Kilocycles</i>	
WGRB.....	Grand Rapids Broadcasting Corp., Grand Rapids, Mich.	250	1200	Unlimited.
WGTC.....	J. J. White, tr. as Greenville Broadcasting Co., Greenville, N. C.	250	1500	Daytime.
WHAL.....	Harold F. Gross and Edmund C. Shields, Saginaw, Mich.	500	950	Do.
WHKY.....	Catawba Valley Broadcasting Co., Inc., Hickory, N. C.	100	1370	Unlimited.
WHLĐ.....	The Niagara Falls Gazette Publishing Co., Niagara Falls, N. Y.	250-LS 1000	1260	Daytime.
WHOP.....	Paducah Broadcasting Co., Inc., northwest of Hopkinsville, Ky.	250	1200	Unlimited.
WHPC.....	Herald Publishing Co., Albany, Ga.	1000	1230	Daytime.
WHUB.....	M. L. Medley, Cookeville, Tenn.	100 250-LS	1370	Unlimited.
WINX.....	Lawrence J. Heller, Washington, D. C.	1 ¹ 250	1310	Do.
WIZE.....	Radio Voice of Springfield, Inc., Springfield, Ohio.	100	1310	Do.
WJHO.....	Yetta G. Samford, C. S. Shealy, Thos. D. Samford, Jr., and J. H. Orr, doing business as Opelika-Auburn Broadcasting Co., Opelika, Ala.	100 250-LS	1370	Do.
WJPF.....	Orville W. Lyerla, N. of Herrin, Ill.	100 250-LS	1310	Do.
WJPR.....	John R. Pepper, Greenville, Miss.	100 250-LS	1310	Do.
WKIP.....	Poughkeepsie Broadcasting Corporation, Poughkeepsie, N. Y.	250	1420	Do.
WKPA.....	Allegheny-Kiski Broadcasting Co., New Kensington, Pa.	250	1120	Daytime.
WKPT.....	C. P. Edwards, Jr., and Howard Long, doing business as Kingsport Broadcasting Co., Kingsport, Tenn.	250	1370	Unlimited.
WLAV.....	Leonard A. Verstuis, Grand Rapids, Mich.	250	1310	Do.
WLOF.....	Hazlewood, Inc., Orlando, Fla.	250	1200	Do.
WLOG.....	Clarence H. Frey and Robert O. Greever, Logan, W. Va.	100	1200	Daytime.
WLOL.....	Independent Merchants Broadcasting Co., Minneapolis, Minn.	1000	1300	Unlimited.
WLPM.....	Suffolk Broadcasting Corporation, Suffolk, Va.	100 250-LS	1420	Do.
WMAN.....	Richland, Inc., Mansfield, Ohio.	250	1370	Daytime.
WMGA.....	Frank R. Pidecock, Sr., Moultrie, Ga.	100 250-LS	1370	Unlimited.
WMJM.....	Cordele Dispatch Publishing Co., Inc., Cordele, Ga.	100 250-LS	1500	Do.
WMOG.....	Coastal Broadcasting Co., Brunswick, Ga.	100 250-LS	1500	Do.
WMRC.....	Textile Broadcasting Co., Greenville, S. C.	250	1500	Do.
WMVA.....	Wm. C. Barnes and Jonas Welland, doing business as Martinsville Broadcasting Co., Martinsville, Va.	100 250-LS	1420	Do.
WMVD.....	The Delmarva Broadcast Co., Salisbury, Md.	250	1200	Do.
WOLF.....	Civic Broadcasting Corporation, Syracuse, N. Y.	100	1500	Do.
WORD.....	Spartanburg Advertising Co., Spartanburg, S. C.	100 250-LS	1370	Do.
WOV.....	Greater New York Broadcasting Corporation, New York, N. Y.	5000	1100	Do.
WPAB.....	Portorican American Broadcasting Co., Inc., Ponce, Puerto Rico.	1000	1340	Do.
WSAM.....	Saginaw Broadcasting Co., Saginaw, Mich.	100 250-LS	1200	Specified hours.
WSLB.....	St. Lawrence Broadcasting Corporation, Ogdensburg, N. Y.	250	1370	Unlimited.
WSOO.....	Hiawathaland Broadcasting Co., Sault Ste. Marie, Mich.	100 250-LS	1200	Do.
WSPB.....	WSPB, Inc., Sarasota, Fla.	100 250-LS	1420	Do.
WSSJ.....	Puerto Rico Advertising Co., Inc., San Juan, Puerto Rico.	250	1500	Do.
WSTV.....	The Valley Broadcasting Co., Steubenville, Ohio.	250	1310	Specified hours. (All hours not used by WSAB.)

¹ 50w amplifier.

Standard broadcast stations deleted for fiscal year ending June 30, 1940

Call letters	Grantee and location	Date of deletion
KECA.....	Earle C. Anthony, Inc., Los Angeles, Calif. (License surrendered and canceled.)	July 31, 1939
KFJZ.....	Fort Worth Broadcasters, Inc., Fort Worth, Tex. (License surrendered and canceled.)	Sept. 6, 1939
KUMA.....	Albert H. Schermann, Yuma, Ariz. (2-20-39 Commission revoked the license and all temporary extensions thereof, effective 3 a. m., E. S. T., 4-1-39; petition filed by KUMA on 3-25-39; 1-24-40 order of revocation made final, effective 3 a. m., E. S. T., 2-1-40.)	Feb. 1, 1940
KWBD.....	W. B. Dennis, Plainview, Tex. (Order of cancellation 5-28-40.) (C. P. only.)	May 28, 1940
KWTN.....	The Greater Kampeska Radio Corporation, Watertown, S. Dak. (Application for renewal of license denied 5-25-38; effective 6-4-38; 6-3-38 Commission granted petition extending effective date 30 days; 11-28-38 issued temporary license pending decision U. S. Court of Appeals; mandate received reaffirming Commission's decision in denying application and station deleted as of 11-6-39.)	Nov. 6, 1939
WBIL.....	Arde Bulova, New York, N. Y. (License surrendered and canceled.)	Jan. 3, 1940
WMVD.....	The Delmarva Broadcast Co., Salisbury, Md. (C. P. only; facilities voluntarily surrendered; deleted 5-21-40.)	May 21, 1940
WOV.....	International Broadcasting Corporation, New York, N. Y. (License surrendered and canceled.)	Jan. 3, 1940
WPG.....	City of Atlantic City, Atlantic City, N. J. (License surrendered and canceled.)	Jan. 3, 1940
WSAL.....	Frank M. Stearns, Salisbury, Md. (10-24-39 Commission revoked license of Station WSAL, effective 3 a. m., E. S. T., 11-13-39; 11-14-39 Commission granted petition to hold hearing on order of revocation; 3-28-40 Commission made final its order of revocation dated 10-24-39, revoking license of WSAL, effective 3 a. m., E. S. T., 3-31-40.)	Mar. 31, 1940

3. STATISTICS ON COMMERCIAL LICENSING

As compared with the previous fiscal year, there has been an increase of 20 percent in the number of applications in the commercial service received. The gain was made, in large part, in the emergency and ship services. A fact frequently overlooked in the emergency service is that the 2,388 licenses authorize the operation of more than twice that number—5,829 to be exact—of portable-mobile and portable stations with an operating power of one watt or less.

The Commercial License Section continued to issue the radio service bulletin semimonthly and revised the list of coastal stations. Forms 401, 403, 407 and 501 were revised during the year. A total of 3,884 new call letters were assigned in the commercial services during that period.

Number of applications and authorizations for all classes of commercial service for fiscal year ending June 30, 1940

	Applica- tions re- ceived	Authoriza- tions issued	New sta- tions au- thorized	Total sta- tions June 30, 1940
Aviation:				
Aeronautical.....	701	742	40	345
Aeronautical point to point.....	221	257	19	141
Aeronautical and Aeronautical point to point.....	47	66	0	0
Public-aeronautical.....	0	0	0	0
Aircraft.....	2,686	2,039	1,730	1,294
Public-aircraft.....	0	0	0	0
Airport.....	144	121	16	66
Radio marker beacon.....	0	0	0	0
Flying school.....	18	17	13	7
Instrument landing.....	0	0	0	0
Subtotal.....	3,817	3,242	818	1,853

¹Includes Alaskan stations.

	Applica- tions re- ceived	Authoriza- tions issued	New sta- tions au- thorized	Total sta- tions June 30, 1940
Private:				
Coastal telegraph.....	3	3	0	3
Coastal harbor.....	0	0	0	0
Public:				
Coastal telegraph.....	70	63	2	52
Coastal harbor.....	110	113	10	27
Coastal telephone.....	4	4	0	4
Marine relay.....	81	77	0	36
Subtotal	268	260	12	122
Emergency:				
Municipal police.....	3,214	2,517	270	1,053
State police.....	457	429	63	246
Zone police.....	180	107	14	64
Interzone police.....	83	81	2	27
Forestry.....	1,118	1,108	379	617
Marine fire.....	28	17	8	12
Special emergency.....	667	577	128	309
Subtotal	5,747	4,896	868	2,328
Experimental:				
Class 1.....	382	437	60	223
Class 2.....	321	253	45	70
Class 3.....	0	0	0	0
Subtotal	703	690	105	293
Point to point telegraph:				
Public.....	688	689	(¹)	67
Press.....	66	185	(¹)	15
Private.....	0	0	0	0
Agriculture.....	7	7	0	7
Subtotal	761	891	0	79
Point to point telephone:				
Public.....	58	115	(¹)	113
Miscellaneous:				
Geological.....	359	307	42	304
Motion picture.....	14	12	2	12
Provisional.....	10	10	5	7
Mobile press.....	3	3	0	3
Relay press.....	9	7	2	7
Subtotal	395	339	51	333
Ships	8,265	7,427	1,423	4,314
Alaskan:				
Aeronautical.....	98	105	25	90
Aeronautical point to point.....	77	82	20	71
Aeronautical and aeronautical point to point.....	50	30	0	0
Aircraft.....	102	115	(²)	85
Coastal telegraph.....	48	57	1	47
Coastal telephone.....	0	0	0	0
Coastal harbor.....	151	130	10	120
Coastal and point to point.....	8	8	0	0
Private:				
Point to point telegraph.....	0	0	0	0
Point to point telephone.....	0	0	0	0
Public:				
Point to point telegraph.....	138	146	14	100
Point to point telephone.....	428	324	60	242
Emergency:				
Special emergency.....	13	9	0	6
Experimental:				
Class 1.....	3	2	0	2
Class 2.....	22	11	0	0
Class 3.....	0	0	0	0
Subtotal	1,138	1,019	120	653
Totals	21,152	18,879	3,397	9,988

¹ Includes Alaskan stations.

² When renewal of licenses for this class of station was considered, the practice of issuing a separate license for each frequency was discontinued and a single license for each location was adopted. For this reason, the total number of stations shown does not represent a decrease in facilities for this type of service.

³ Included in aircraft stations classified in the United States.

Wire certificates year ending June 30, 1940

	Received	Granted
Telephone.....	54	49
Telegraph.....	8	11

4. STATISTICS ON AMATEUR LICENSING

Amateur radio applications

Received:		
Pending July 1, 1939.....	1, 229	
Received during the fiscal year.....	37, 951	
		39, 180
Disposed of:		
Approved.....	25, 362	
Returned to applicants.....	5, 891	
Referred to other Federal agencies, etc.....	256	
Failed required examinations.....	4, 756	
		36, 265
Pending, close of June 30, 1940.....		2, 915

Amateur radio authorizations

Station licenses:		
New.....	6, 019	
Renewed.....	7, 724	
Modified and reissued.....	10, 805	
		24, 548
Operator licenses.....	24, 605	
Operator license endorsements.....	8	
Duplicates of lost or destroyed.....	513	
		25, 126
Total.....		49, 674

Amateur radio station licenses

Valid at close of fiscal year 1939.....	53, 558	
Plus:		
Expired but not deleted June 30, 1939.....	1, 111	
New issues, fiscal year 1940.....	6, 019	
		60, 688
Less eliminations, fiscal year 1940:		
Revocations.....	3	
Cancellations.....	174	
Deletions.....	2, 833	
Expirations (renewal yet possible).....	1, 383	
		4, 393
Valid June 30, 1940.....		56, 295

5. STATISTICS ON FIELD ACTIVITIES

An unprecedented number of requests for investigations, recordings, reports of unlicensed operative and subversive activity by users of radio were received by the field division during the year. The demand far exceeded the capabilities of personnel and equipment until special funds were forthcoming to assume extra tasks imposed by the national-defense program.

The demand for commercial radio operators will necessitate extending the examination service to applicants throughout the United States and Territories during the next fiscal year.

TABLE I.—Ship stations—Inspections and notices

District No. and location	United States Ships						Foreign ships					
	Stations inspected		Notices served				Stations inspected		Notices served			
	Compulsorily equipped	Voluntarily equipped	Violation of laws	Violation of regulations	Advisory notices	Violations cleared during inspection	Compulsorily equipped	Voluntarily equipped	Violation of law and S. Conv.	Violation of treaty	Advisory notices	Violations cleared during inspection
1. Boston, Mass.....	686	38	92	30	241	0	493	5	102	0	8	0
2. New York, N. Y.....	1,391	11	162	34	502	661	1,137	13	74	9	15	78
3. Philadelphia, Pa.....	547	17	34	58	154	219	435	8	71	11	9	21
4. Baltimore, Md.....	1,090	14	61	72	323	260	715	18	155	10	224	27
5. Norfolk, Va.....	293	8	7	13	79	163	359	3	123	0	11	26
6. Atlanta, Ga.....	151	12	13	5	26	122	115	3	18	0	3	17
7. Miami, Fla.....	332	36	35	20	131	130	146	4	12	0	38	26
8. New Orleans, La.....	398	9	52	6	100	272	534	1	65	4	10	93
9. Galveston, Tex.....	656	10	45	29	188	219	224	0	54	0	8	19
11. Los Angeles, Calif.....	569	328	18	119	99	264	758	0	80	0	0	93
12. San Francisco, Calif..	532	7	75	26	174	125	252	0	21	0	0	13
13. Portland, Oreg.....	189	6	11	6	42	63	118	0	13	1	17	6
14. Seattle, Wash.....	425	126	21	8	52	368	190	0	6	0	0	15
17. Kansas City, Mo.....	0	7	0	0	0	0	0	0	0	0	0	0
18. Chicago, Ill.....	9	1	0	0	0	0	0	0	0	0	0	0
19. Detroit, Mich.....	16	33	0	1	3	10	0	1	0	0	0	0
20. Buffalo, N. Y.....	7	130	0	0	0	0	0	0	0	0	0	0
21. Honolulu, T. H.....	197	21	28	22	77	44	77	0	5	1	8	14
22. San Juan, P. R.....	149	0	5	1	28	83	45	2	8	0	3	15
Total.....	7,637	814	659	420	2,219	3,003	5,598	58	807	36	354	463

TABLE II.—Land-station inspections

District No. and location	Telegraph											Telephone					Broadcast						Violation notices served as result of inspection	
	Aircraft	Emergency	Special emergency	Coastal	Marine relay	Aeronautical	Amateur	Forestry	Marine fire	Experimental	Point-to-point	Coastal	Coastal harbor	Ship	Experimental	Point-to-point	Regular	International	High frequency	Experimental	Relay	Television		Facsimile
1. Boston, Mass.....	40	93	0	6	5	21	20	7	1	3	3	0	1	0	0	0	112	9	5	0	15	0	0	25
2. New York, N. Y.....	235	151	4	6	3	16	12	2	0	3	7	0	1	0	0	0	70	10	15	0	63	8	5	125
3. Philadelphia, Pa.....	64	142	9	3	1	14	8	47	0	1	0	0	0	0	0	0	63	3	2	0	23	3	0	58
4. Baltimore, Md.....	23	18	0	1	0	17	10	10	0	0	4	0	0	0	0	0	25	0	1	0	23	0	0	6
5. Norfolk, Va.....	9	46	1	0	0	5	1	0	0	0	0	0	0	0	0	0	58	0	0	0	18	0	0	48
6. Atlanta, Ga.....	32	99	13	4	4	60	6	0	0	0	0	0	3	0	0	0	131	0	3	5	38	0	3	140
7. Miami, Fla.....	121	71	21	6	4	31	11	1	0	0	0	1	0	0	0	0	47	2	0	1	21	0	0	47
8. New Orleans, La.....	15	44	5	3	3	21	7	0	1	3	23	0	1	0	0	0	63	0	0	1	13	0	0	57
9. Galveston, Tex.....	34	20	0	11	3	34	2	0	0	0	0	0	0	0	0	0	21	0	0	0	7	0	0	21
10. Dallas, Tex.....	109	125	0	0	0	42	7	0	0	0	2	0	0	0	1	142	0	3	0	32	0	1	80	
11. Los Angeles, Calif.....	71	131	34	3	3	31	7	9	1	7	0	0	2	191	1	0	71	0	4	3	53	4	0	125
12. San Francisco, Calif.....	44	107	36	5	4	19	6	0	0	3	0	0	1	14	0	0	58	1	0	0	7	0	0	139
13. Portland, Oreg.....	15	27	5	2	1	10	5	1	0	0	1	0	0	0	0	0	46	0	0	0	4	0	0	25
14. Seattle, Wash.....	36	99	2	12	2	39	0	0	0	1	6	0	0	0	9	81	0	0	0	14	0	0	72	
15. Denver, Colo.....	25	14	4	0	0	24	0	0	0	0	2	0	0	0	0	56	0	2	0	35	0	0	12	
16. St. Paul, Minn.....	1	34	2	6	1	27	2	3	0	0	3	0	1	0	0	101	0	5	0	35	0	0	67	
17. Kansas City, Mo.....	53	87	10	1	0	17	7	0	0	2	0	0	0	0	0	117	0	7	2	39	1	4	56	
18. Chicago, Ill.....	123	251	0	0	0	26	4	0	0	17	4	0	3	10	0	120	1	4	4	133	5	0	140	
19. Detroit, Mich.....	101	219	18	7	4	33	13	8	1	2	9	0	0	1	0	122	2	3	0	145	0	15	102	
20. Buffalo, N. Y.....	25	77	15	1	1	16	6	44	0	8	1	0	1	0	0	97	4	3	0	51	0	2	115	
21. Honolulu, T. H.....	5	5	0	2	2	6	0	0	0	1	31	1	0	13	2	6	0	0	0	0	0	0	0	8
22. San Juan, P. R.....	4	0	1	0	0	0	0	0	0	0	2	0	1	0	3	6	0	0	0	0	0	0	0	6
Total.....	1,193	1,860	180	79	41	509	134	132	4	51	98	2	13	231	4	29	1,613	32	63	16	769	21	30	1,474

TABLE III.—Frequency measurements

District No. and location	Telegraph											Telephone						Broadcast										
	Ship	Aircraft	Special emergency	Coastal	Aeronautical	Amateur	Forestry	Point-to-point	Government	Foreign	Deviations beyond tolerance	Point-to-point	Coastal	Coastal harbor	Ship	Experimental	Deviations beyond tolerance	Regular	International	High frequency	Relay	Experimental	Deviations beyond tolerance	Violation notices served as result of monitoring	Harmonic notices served as result of monitoring			
1. Boston, Mass.	12	14	800	393	399	1	0	162	205	19	55	0	0	38	0	13	0	1,527	0	1	0	0	0	0	93	12		
2. New York, N. Y.	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3. Philadelphia, Pa.	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
4. Baltimore, Md.	126	1,049	1,235	1,369	1,003	230	4	548	456	98	244	0	37	108	20	0	0	2,522	6	10	1	2	2	1,378	0	0		
5. Norfolk, Va.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6. Atlanta, Ga.	0	450	668	162	1,671	44	6	21	56	9	43	0	0	19	0	0	0	1,725	0	0	0	0	0	6	42	5		
7. Miami, Fla.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8. New Orleans, La.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9. Galveston, Tex.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	
10. Dallas, Tex.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	
11. Los Angeles, Calif.	65	11	63	177	42	22	1	11	150	69	64	1	5	85	1	23	976	17	9	1	0	4	4	133	1	1		
12. San Francisco, Calif.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	
13. Portland, Oreg.	1,112	323	1,804	497	944	60	0	1,226	376	324	203	20	5	17	203	10	4	1,171	45	39	0	3	3	797	13	0		
14. Seattle, Wash.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	
15. Denver, Colo.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	
16. St. Paul, Minn.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	
17. Kansas City, Mo.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18. Chicago, Ill.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19. Detroit, Mich.	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	51	0	0	
20. Buffalo, N. Y.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	
21. Honolulu, T. H.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	
22. San Juan, P. R.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Great Lakes, Ill.	151	358	1,102	205	634	74	0	28	618	32	61	0	0	62	67	0	0	3,154	12	6	20	1	1	104	1	0		
Grand Island, Nebr.	396	1,319	1,653	864	3,096	298	0	2,378	72	139	322	40	7	4	43	2	0	4,000	315	1	0	2	2	220	65	0		
Total	1,862	3,524	7,326	3,667	7,789	729	12	4,374	1,933	690	996	61	50	253	419	26	27	15,075	395	60	8	25	18	2,879	97			

TABLE IV.—Applicants for radio operator licenses examined

District No. and location	Commercial							Amateur except class C	
	First telegraph	Second telegraph	Telegraph permit	First telephone	Second telephone	Telephone permit	Code test only	Class A	Class B
1. Boston, Mass.	49	125	10	109	89	1,609	183	256	657
2. New York, N. Y.	55	140	23	272	166	2,207	219	328	1,221
3. Philadelphia, Pa.	10	32	2	52	102	537	48	113	310
4. Baltimore, Md.	24	46	4	80	57	380	69	51	114
5. Norfolk, Va.	10	16	5	43	29	713	31	57	134
6. Atlanta, Ga.	10	33	3	83	59	589	49	147	374
7. Miami, Fla.	15	38	16	55	58	841	68	52	77
8. New Orleans, La.	21	54	3	51	23	531	79	68	96
9. Galveston, Tex.	20	61	30	55	79	290	96	45	90
10. Dallas, Tex.	5	47	11	97	56	1,873	71	138	377
11. Los Angeles, Calif.	59	142	17	166	85	1,840	218	237	794
12. San Francisco, Calif.	27	78	16	99	58	870	124	135	378
13. Portland, Oreg.	8	29	9	55	27	281	46	67	128
14. Seattle, Wash.	21	44	18	84	75	1,137	38	112	283
15. Denver, Colo.	2	12	10	63	71	314	22	82	128
16. St. Paul, Minn.	3	27	9	96	49	647	32	106	230
17. Kansas City, Mo.	13	140	13	324	133	757	166	226	728
18. Chicago, Ill.	20	104	12	228	122	7,362	134	248	752
19. Detroit, Mich.	18	103	28	202	154	1,473	144	270	1,195
20. Buffalo, N. Y.	6	60	7	106	31	790	10	123	463
21. Honolulu, T. H.	10	18	7	11	3	162	38	30	135
22. San Juan, P. R.	11	3	0	5	5	18	4	3	16
Total	417	1,352	253	2,336	1,531	25,221	1,889	2,894	8,680

TABLE V.—Commercial operators licensed

District number and location	First telegraph	Second telegraph	Telegraph permit	First telephone	Second telephone	Telephone permit
1. Boston, Mass.	136	82	23	231	58	2,133
2. New York, N. Y.	304	107	21	383	151	2,826
3. Philadelphia, Pa.	51	37	6	116	77	868
4. Baltimore, Md.	96	52	8	148	55	491
5. Norfolk, Va.	29	15	4	79	12	739
6. Atlanta, Ga.	34	33	3	152	30	606
7. Miami, Fla.	80	64	9	104	48	999
8. New Orleans, La.	132	54	8	142	14	523
9. Galveston, Tex.	67	57	22	82	50	330
10. Dallas, Tex.	13	41	14	162	39	1,851
11. Los Angeles, Calif.	125	108	20	285	86	2,184
12. San Francisco, Calif.	148	87	11	159	73	941
13. Portland, Oreg.	34	25	7	91	40	327
14. Seattle, Wash.	71	50	14	133	70	1,252
15. Denver, Colo.	5	9	7	89	52	343
16. St. Paul, Minn.	11	24	5	122	41	633
17. Kansas City, Mo.	18	89	18	320	107	957
18. Chicago, Ill.	61	98	18	318	98	4,357
19. Detroit, Mich.	44	76	26	312	111	1,893
20. Buffalo, N. Y.	14	19	6	122	25	823
21. Honolulu, T. H.	35	18	4	19	5	170
22. San Juan, P. R.	16	5	1	10	1	21
Total	1,514	1,150	255	3,579	1,243	25,267

TABLE VI.—Complaints and investigations

District No. and location	Cases received						Cases closed						
	Amateur	Unlicensed broadcast	Unlicensed other	Electric and power	Broadcast	Miscellaneous	Amateur	Unlicensed broadcast	Unlicensed other	Electric and power	Broadcast	Miscellaneous	Outstanding cases
1. Boston, Mass.	178	1	24	60	14	50	176	1	24	60	14	50	2
2. New York, N. Y.	284	29	31	93	47	26	284	29	31	93	47	26	0
3. Philadelphia, Pa.	163	1	15	25	4	34	146	1	12	25	4	33	21
4. Baltimore, Md.	51	0	11	14	5	15	48	0	5	14	5	13	11
5. Norfolk, Va.	42	2	5	16	2	13	42	0	5	16	2	13	2
6. Atlanta, Ga.	66	8	22	10	5	7	60	8	20	10	4	7	9
7. Miami, Fla.	65	1	11	40	16	52	64	1	11	40	16	49	4
8. New Orleans, La.	72	2	3	14	14	6	57	2	3	14	10	6	19
9. Galveston, Tex.	20	0	6	4	0	5	20	0	6	4	0	5	0
10. Dallas, Tex.	79	4	34	6	12	27	75	4	21	5	11	25	22
11. Los Angeles, Calif.	377	1	26	89	11	70	363	1	7	89	3	69	42
12. San Francisco, Calif.	137	0	1	157	1	114	135	0	1	157	1	114	2
13. Portland, Ore.	51	0	3	11	1	6	51	0	3	10	1	6	1
14. Seattle, Wash.	59	0	9	18	4	27	51	0	9	18	4	27	8
15. Denver, Colo.	22	0	0	3	0	1	20	0	0	3	0	1	2
16. St. Paul, Minn.	56	0	1	1	0	1	53	0	1	1	0	1	1
17. Kansas City, Mo.	82	2	16	4	0	3	66	0	6	3	0	2	30
18. Chicago, Ill.	321	0	54	25	0	10	316	0	53	25	0	10	9
19. Detroit, Mich.	216	2	59	26	6	78	194	2	40	25	6	72	50
20. Buffalo, N. Y.	122	1	26	1	1	14	122	1	23	1	1	14	3
21. Honolulu, T. H.	38	0	0	31	29	17	37	0	0	31	29	17	1
22. San Juan, P. R.	0	3	11	0	1	1	0	2	8	0	0	1	5
Total	2,499	57	368	648	173	577	2,380	52	289	644	158	561	244

6. PETITIONS FOR REHEARING IN BROADCAST CASES

PETITIONS FOR REHEARING IN BROADCAST CASES ACTED UPON DURING FISCAL YEAR ENDING JUNE 30, 1940

[These do not include petitions in common-carrier cases, which are listed separately]

- Petition for rehearing filed by Asheville Citizen Times (WWNC) (re application of Ohio State U (WOSU)). *Denied* July 12, 1939.
- Petition for reconsideration and rehearing filed by Central New York Broadcasting Corp. (WSYR) (re application of Ohio State U (WOSU)). *Denied* July 12, 1939.
- Petition for rehearing filed by KANS Broadcasting Co. (KANS) (re application of Farmers & Bankers Broadcasting Corp. (KFBI)). *Denied* July 12, 1939.
- Petition for rehearing filed by The Radio Station KFJH Co. (KFJH) (re application of Farmers & Bankers Broadcasting Corp. (KFBI)). *Denied* July 12, 1939.
- Petition for rehearing filed by applicant, The Baltimore Radio Show, Inc. (WFBR). *Denied* September 12, 1939.
- Petition for rehearing filed by the applicant, WIS, Inc. *Denied* September 12, 1939.
- Petition of applicant, F. W. Meyer, for rehearing. *Granted* October 24, 1939.
- Petition to reconsider or rehear, filed by The Times Dispatch Radio Corp. (WRTD) (re application of Havens & Martin, Inc. (WMBG)). *Denied* October 31, 1939.
- Petition to reconsider or rehear, filed by Richmond Radio Corp. (WRNL) (re application of Havens & Martin, Inc. (WMBG)). *Denied* October 31, 1939.
- Petition for rehearing filed by applicant, Owensboro Broadcasting Co. *Denied* August 8, 1939.
- Petition for rehearing filed by Baton Rouge Broadcasting Co. (WJBO) (re application of R. J. Laubengayer (KSTL)). *Denied* September 6, 1939.
- Petition of Harrisburg Broadcasting Co. (WEBQ) (re application of Orville W. Lyerla). *Granted* October 10, 1939, and set for reargument.

13. Petition of Allen T. Simmons for rehearing (re application of Summit Radio Corp.). *Granted* October 10, 1939.
14. Petition of WJW, Inc., for rehearing (re application of Summit Radio Corp.). *Dismissed* October 10, 1939.
15. Petition for rehearing filed by First State Television, Inc. (KITE) (re application of Allen T. Simmons). *Granted* October 10, 1939.
16. Petition of applicant, Yuma Broadcasting Co., for reconsideration and oral argument. *Denied* October 31, 1939.
17. Petition of Louis R. Spiwak and Maurice R. Spiwak, doing business as L. & M. Broadcasting Co., for rehearing and intervention (re application of Mason City Globe-Gazette Co. (KGLO)). *Denied* November 7, 1939.
18. Petition for rehearing filed by E. C. Palmer (re application of Clyde E. Wilson and Howard A. Shuman, doing business as Hot Springs Broadcasting Co.). *Denied* October 17, 1939.
19. Petition for rehearing filed by the applicant, Hildreth & Rogers Co. (WLAW). *Denied* November 14, 1939.
20. Petition of The Gateway Broadcasting Co. for hearing or rehearing (re application of Northside Broadcasting Corp.). *Denied* February 7, 1940.
21. Petition of Sentinel Broadcasting Corp. for rehearing (re application of Civic Broadcasting Corp.). *Denied* November 27, 1939.
22. Petition of American Broadcasting Co. (WOL) for rehearing (re application of Lawrence J. Heller). *Dismissed* May 7, 1940.
23. Petition for rehearing filed by Kentucky Broadcasting Corp. (re application of Northside Broadcasting Corp. (WGRC)). *Denied* November 20, 1939.
24. Petition filed by Queen City Broadcasting Co., Inc. (KIRO) (re application of The Station of the Stars, Inc. (KMPC)). *Dismissed* December 2, 1939.
25. Petition of the applicant, Hampden-Hampshire Corporation, for rehearing. *Dismissed* December 12, 1939.
26. Petition of the applicant, Thumb Broadcasting Co., for rehearing. *Granted* January 17, 1940.
27. Petition of Colorado Radio Corp. (KVOD) for rehearing (re application of F. W. Meyer). *Denied* January 9, 1940.
28. Petition for rehearing filed by Eugene P. O'Fallon, Inc. (KFEL) (re application of F. W. Meyer). *Denied* January 9, 1940.
29. Petition of Virgil V. Evans (WSPA) (re application of Spartanburg Advertising Co.). *Denied* January 9, 1940.
30. Petition for rehearing filed by KGKO Broadcasting Co. (re application of Red River Valley Broadcasting Corp.). *Denied* January 17, 1940.
31. Petition for rehearing filed by applicant, Gateway Broadcasting Co. *Denied* February 7, 1940.
32. Petition for rehearing filed by Samuel M. Emison (re application of Vincennes Newspapers). *Denied* January 29, 1940.
33. "Protest" of Julio N. Conesa (re application of Portorican American Broadcasting Co., Inc.). *Denied* January 29, 1940.
34. Petition for reconsideration and rehearing filed by Puerto Rico Advertising Co., Inc. (re application of Portorican American Broadcasting Co., Inc.). *Denied* January 29, 1940.
35. Petition for rehearing filed by Hildreth & Rogers (WLAW) (re application of WPTF Co.). *Denied* March 12, 1940.
36. Petition for reconsideration filed by Debs Memorial Fund, Inc. (WEVD) (re application of Greenville News Piedmont Co. (WFBC)). *Denied* March 12, 1940.
37. Petition for rehearing filed by The Watch Tower Bible & Tract Society, Inc. (WBBR) (re application of Greenville News Piedmont Co. (WFBC)). *Denied* March 12, 1940.
38. Petition for rehearing filed by Earl C. Anthony (KFI) (re applications of McClatchy Broadcasting Co. (KERN) and The Bee, Inc. (KOH)). *Denied* March 12, 1940.
39. Petition for rehearing filed by Mosely, Inc. (KGVO) (re application of Golden Empire Broadcasting Co. (KHSL)). *Dismissed* May 7, 1940.
40. Petition for rehearing filed by KTHR Broadcasting Co. (re application of M. C. Reese). *Denied* March 12, 1940.
41. Petition for rehearing filed by Salt River Valley Broadcasting Co. (KOY) (re application of M. C. Reese). *Denied* March 12, 1940.
42. Petition for rehearing filed by the applicant, Plattsburg Broadcasting Corporation. *Denied* March 12, 1940.

43. Petition for hearing, protest, and request to vacate action, filed by William H. Amesbury (re application of Independent Merchants Broadcasting Co.). *Dismissed* March 12, 1940.

44. Petition for hearing or rehearing filed by Scripps Howard Radio, Inc. (WCPO) (re application of WCOL). *Denied* March 29, 1940.

45. Petition for rehearing filed by Golden Gate Broadcasting Corporation (re application of Marysville Yuba City Broadcasters, Inc.). *Denied* May 7, 1940.

46. Protest and request for hearing filed by Albany Broadcasting Co., Inc. (WGPO) (re application of E. D. Rivers). *Denied* May 7, 1940.

47. Petition for rehearing filed by Caribbean Broadcasting Association, Inc. (re application of Puerto Rico Advertising Co., Inc.). *Denied* May 7, 1940.

48. Petition for rehearing filed by applicants, Chester A. Thompson and the Brush Moore Newspapers, Inc. *Granted* June 6, 1940.

49. Petition for rehearing filed by Congress Square Hotel Co. (re application of Thompson L. Guernsey). *Denied* June 18, 1940.

50. Petition for rehearing and request for special relief, filed by Oregon State Agricultural College (KOAC) (re application of Salt River Valley Broadcasting Co. (KOY)). *Dismissed* June 4, 1940.

51. Petition for rehearing filed by Orlando Broadcasting Co., Inc. (re application of Hazelwood, Inc.). *Denied* June 4, 1940.

52. Petition of WLEU Broadcasting Co. for rehearing (re application of Presque Isle Broadcasting Co.). *Denied* June 25, 1940.

53. Petition for rehearing filed by Puget Sound Broadcasting Co. (re application of Queen City Broadcasting Co. (KIRO)). *Denied* June 1, 1940.

54. Petition for reconsideration, filed by Radio Corporation of Orlando (re application of Hazelwood, Inc.). *Dismissed* June 4, 1940.

55. Petition for reconsideration and further hearing, filed by Sanders Bros. Radio Station (WKBB) (re application of Telegraph Herald). *Dismissed* June 18, 1940.

56. Petition of WCBD, Inc., for rehearing (re application of Evangelical Lutheran Synod). *Denied* June 25, 1940.

7. ACTIONS ON COMMON CARRIER REHEARING PETITIONS

Petitions for rehearing in common carrier cases acted upon during fiscal year ending June 30, 1940

TELEGRAPH

Docket No.:

5796 } No-Bel Radio Burglar Alarm Co. Petition for Rehearing filed by above
5797 } on February 21, 1940. *Granted* 3/22/40.

4557 Howton Radio Alarm Co. Petition for Rehearing filed by above on
December 27, 1939. *Denied* 1/29/40.

4396 Mackay Radio & Tel. Co. (Rome, Italy).

4397 }

4398 } Petition for Rehearing filed by Mackay 4/1/40. *Denied* 5/7/40.

4399 }

TELEPHONE

5594 Eddie Erlbacher. Motion to Remand for further hearing filed by
Warner & Tamble on May 4, 1940. *Denied* 5/22/40.

5327 Thorne Donnelley. Petition to set aside Commission's decision filed
by Central Radio Telegraph Co. on April 22, 1940. *Denied* 5/7/40.

8. LIST OF APPROVED TYPES OF MARINE RADIO EQUIPMENT

AUTOMATIC ALARM RECEIVERS¹

Manufacturer:

	<i>Type No.</i>
Federal Telegraph Co. for Mackay Radio and	
Telegraph Co.-----	101-A.
Do-----	101-B.
Radiomarine Corporation of America-----	AR-8600.

¹ As provided in Commission Order No. 66 of March 29, 1940, approval of individual automatic alarm receivers of any one of the approved types listed, installed on a ship for the purpose of complying with title III, part II, of the Communications Act of 1934, as amended, is limited to a date 7 years following the date when the particular receiver in question was first placed in service on board a ship.

TRANSMITTERS²

Main radiotelegraph transmitters approved as capable of meeting the requirements of Section 8.142 of the Commission's Rules Governing Ship Service.

Manufacturer:	Type No.
Federal Telegraph Co.....	150-A and B.
Do.....	155-A.
Radiomarine Corporation of America.....	ET-3626-B, BR and C.
Do.....	ET-3674-A and R.
Do.....	ET-8006.
Do.....	ET-8010 and 8010-B.
Do.....	ET-8017.
States Steamship Co.....	HF-100 and 100-A.

Main radiotelegraph transmitters approved as capable of meeting the requirements of section 8.143 (a) and (b) of the Commission's Rules Governing Ship Service.

Manufacturer:	Type No.
Federal Telegraph Co.....	120-M.
Radiomarine Corporation of America.....	ET-3627-S, AS and BS.
Do.....	ET-3628.
Do.....	ET-3629.
Do.....	ET-3630.
Do.....	B-1-C.

Main and emergency transmitters approved as capable of meeting the requirements of sections 8.142 and 8.144 of the Commission's Rules Governing Ship Service.

Manufacturer:	Type No.
Federal Telegraph Co.....	123-B.
Do.....	150-A-101-A.
Do.....	150-B-101-A.
Do.....	155-A-101-A.
Heintz & Kaufman, Limited.....	935.
Radiomarine Corporation of America.....	ET-8010 and BA.

Main and emergency transmitters approved as capable of meeting the requirements of sections 8.143 (a) and (b) and 8.144 of the Commission's Rules Governing Ship Service.

Manufacturer:	Type No.
Federal Telegraph Co.....	104-M.
Do.....	147-A and M.

Emergency transmitters approved as capable of meeting the requirements of section 8.144 of the Commission's Rules Governing Ship Service.

Manufacturer:	Type No.
Federal Telegraph Co.....	142-A, B, and C.
Do.....	149-A.
Radiomarine Corporation of America.....	ET-3650.
Do.....	ET-8003 and 8003-A.

² Marine radiotelegraph transmitters are approved as capable of meeting the applicable specific requirements of sections 8.142, 8.143, and 8.144 of the Commission's rules governing ship service and the relevant technical requirements of section 354 of the Communications Act of 1934, as amended, particularly paragraphs (c) and (d) in their entirety and the normal range requirement of paragraph (f) of this section of the act. A list of designated spare parts to be associated with each approved type of transmitter has been approved in accordance with the provisions of section 8.234 of the Commission's rules governing ship service and section 356 of the Communications Act of 1934, as amended. Copies of these lists are made available to interested parties upon request.

9. PUBLICATIONS

LIST OF PRINTED MATTER PREPARED DURING YEAR

The following printed material was placed on sale by the Superintendent of Documents during the fiscal year.

Rules and Regulations of the Commission:

- Part 1.—Rules of Practice and Procedure (effective Aug. 1, 1939).
- Part 2.—*General Rules and Regulations* (effective June 15, 1939).
- Part 3.—Rules Governing Standard Broadcast Stations (effective August 1, 1939).
- Part 4.—Rules Governing Broadcast Services other than Standard Broadcast (effective May 23, 1939).
- Part 5.—Rules and Regulations Governing Experimental Radio Services (effective October 1, 1939).
- Part 6.—Rules Governing Fixed Public Radio Service (effective December 1, 1939).
- Part 7.—Rules Governing Coastal and Marine Relay Services (revised to November 4, 1939).
- Part 8.—Rules Governing Ship Service (revised to November 14, 1939).
- Part 9.—Rules and Regulations Governing Aviation Services (revised to November 20, 1939).
- Part 10.—Rules Governing Emergency Radio Service (revised to February 27, 1939).
- Part 11.—Rules Governing Miscellaneous Radio Services (effective January 1, 1939).
- Part 12.—Rules Governing Amateur Radio Station and Operators (revised to April 18, 1940).
- Part 13.—Rules Governing Commercial Radio Operators (effective July 1, 1939).
- Part 14.—Rules Governing Radio Stations in Alaska (effective December 5, 1938).
- Part 41.—Telegraph and Telephone Franks (effective August 11, 1939).
- Part 42.—Rules Governing the Destruction of Records of Telecommunication Carriers (effective September 6, 1938).
- Part 43.—Reports (rules governing the filing of information, contracts, periodic reports, etc.) (effective August 11, 1939).
- Part 61.—Tariffs (effective September 1, 1939).
- Part 62.—Rules Governing Applications under Sec. 212 of the Act to Hold Interlocking Directorates (effective September 1, 1939).

Study Guide and Reference Material for Commercial Radio Operator Examinations (July 1, 1939).

In addition, the Commission in May issued its first printed general information booklet, "An ABC of the FCC" (more than a dozen pages of basic questions and answers), which is obtainable without cost upon request to the Commission.

LIST OF PRINTED MATTER FOR SALE BY SUPERINTENDENT OF DOCUMENTS

Following is a list of Federal Communications Commission publications of general interest sold by the Government Printing Office, Superintendent of Documents, Washington, D. C.; with price, and the approximate number on hand at that office:

Title	Price	Approximate number on hand at Government Printing Office Dec. 6, 1940
Communications Act of 1934 with Amendments and Index Thereto. Federal Communications Commission reports (bound volumes of decisions and orders, exclusive of annual reports):	\$0.15	Now being reprinted.
Volume 1—July 1934, July 1935.....	1.00	90.
Volume 2—July 1935, June 1936.....	2.00	206.
Volume 3—July 1936, Feb. 1937.....	2.00	283.
Volume 4—March 1937, Nov. 15, 1937.....	1.50	285.
Volume 5—Nov. 16, 1937, June 30, 1938.....	1.50	410.
Volume 6—July 1, 1938, to Feb. 28, 1939.....	1.50	495.
Annual reports of the Commission:		
First Annual Report—Fiscal Year 1935.....	.15	467.
Third Annual Report—Fiscal Year 1937.....	.30	35.
Fifth Annual Report—Fiscal Year 1939.....	.30	78.
Study Guide and Reference Material for Commercial Radio Operator Examinations.....	.15	None [reprinting].
Rules and Regulations of the Federal Communications Commission:		
Part 1, Practice and Procedure.....	.10	Now being reprinted.
Part 2, General Rules and Regulations.....	.10	Now being reprinted.
Part 3, Rules Governing Standard Broadcast Stations.....	.10	None [reprinting].
Part 4, Rules Governing Broadcast Services (other than standard broadcast).....	.10	1,580.
Part 5, Experimental Rules.....	.05	2,838.
Part 6, Rules Governing Fixed Public Radio Services.....	.05	Now being reprinted.
Part 7, Rules Governing Coastal and Marine Relay Services.....	.05	Now being reprinted.
Part 8, Ship Rules.....	.10	None [reprinting].
Part 9, Rules and Regulations Governing Aviation Services.....	.05	None [reprinting].
Part 10, Rules Governing Emergency Radio Services.....	.05	None [reprinting].
Part 11, Rules Governing Miscellaneous Radio Services.....	.05	1,860.
Part 12, Rules Governing Amateur Radio Stations and Operators.....	.10	8,905.
Part 13, Rules Governing Commercial Radio Operators.....	.05	405.
Part 14, Rules Governing Radio Stations in Alaska (other than amateur and broadcast).....	.05	252.
Part 41, Rules Governing Telegraph and Telephone Franks.....	.05	720.
Part 42, Rules Governing the Destruction of Records of Telecommunication Carriers.....	.10	160.
Part 43, Rules Governing the Filing of Information, Contracts, Etc., of Telecommunication Carriers.....	.05	660.
Part 61, Tariffs—Rules Governing the Construction, Filing, and Posting of Schedules of Charges for Interstate and Foreign Communications Service.....	.10	225.
Part 62, Rules Governing Application under Sec. 212 of the Act to Hold Interlocking Directorates.....	.05	785.
Standards of Good Engineering Practice Concerning Standard Broadcast Stations (550-1600 kc), revised to July 20, 1940.....	.30	1,000